

THE T. DENNY SANFORD INSTITUTE FOR EMPATHY AND COMPASSION

EXECUTIVE SUMMARY:

Empathy and compassion are essential to human wellbeing and happiness. Long considered the province of philosophy and spiritual practice, the increasing availability of the tools needed to understand brain function have shown that these operations of the human mind rely on the activation of specific brain regions and are driven by dynamic interactions between specific neural circuits. Thus, we conclude that for the first time it will be possible to explore the neurobiological bases of empathy and compassion and to use the novel insights that arise to enhance the ability of individuals to engage in these important prosocial activities. We propose that through the creation of the T. Denny Sanford Institute for Empathy and Compassion we will markedly increase understanding of empathy and compassion and define novel methods for translating fundamental research advances to into effective training programs. While the Institute focus initially targets medical students and physicians, whose profession creates significant challenges to maintaining care delivered with empathy and compassion, we intend to create and extend programs that enhance empathy and compassion across the entire UC San Diego campus. Indeed, we envision that our work will extend far beyond our campus and for decades to come.

OVERVIEW:

Empathy and compassion play vital roles in virtually all aspects of human endeavor. Indeed, our species could scarcely exist, much less prosper, without the agencies of empathy and compassion (Riess and Porent, 2018). Conceptually, empathy and compassion represent the products of different but highly complementary manifestations of brain function. Empathy is the ability to “understand another’s viewpoint”, “to vicariously feel another’s pain”, and more colloquially “to walk in another’s shoes”. Compassion, in contrast, is reaching out to alleviate another’s distress. It is an active response informed and empowered by empathy. Widely considered to be fundamental for societal cooperation, a growing empirical literature demonstrates that empathy and compassion are closely tied to physical and psychological health and well-being. As a corollary, personal and societal wellbeing suffer when empathy and compassion are not engaged. Countless ongoing crises are evidence of the failure to understand the suffering of others and act to care for them. Why, one must ask, do such failures occur? What root causes are responsible for the breakdown of prosocial behavior? What can one do to enhance the ability to respond to and prevent such crises? We argue that the time is right for exploring the brain bases for empathy and compassion. We hypothesize that in so doing we will learn not only how to measure these properties of brain function but will also gain insights into how to enhance the ability to empathize and to compassionately care for others. By translating the insights into the brain bases for empathy and compassion ours will be a rich legacy of increased human wellbeing - one that extends far beyond our campus and this time.

The T. Denny Sanford Institute instantiates an effort of unprecedented focus and scope whose mission is to decipher the neurobiological bases of empathy and compassion and to apply new insights to human wellbeing. Thus, not only will we support rigorous neuroscientific discovery, we will translate the fruits of research into programs that enhance the ability of our colleagues to practice empathy and compassion. Our first translational efforts will address the needs of professionals whose work to alleviate human suffering places them at the vortex of the forces that create challenges to the ability to empathize and care. Thus, beginning with medical students and then physicians we will develop programs that enable self-awareness and empower the ability to more effectively understand and minister to patients. As we progress, and as soon as the fruits of our research and its applications allow, we will address the needs of other professionals across a wide range of disciplines and individuals across all career stages. Simply stated, our goal is to

become the foremost center for research in empathy and compassion and for translating advances to enhance empathy and compassion in individuals, communities, and across nations.

The center will be organized around the pursuit of four key questions, uniting our faculty strengths across a broad spectrum of disciplines including the neurosciences, social and behavioral sciences, and engineering: 1) What is the brain basis for empathy and compassion – what circuits are involved and how are they regulated? 2) Why are some individuals more empathic and compassionate than others – what roles are played by the context in which they work, their life experiences and genetic factors? 3) Can one use neurobiological observations not only to measure the impact of training for empathy and compassion but to devise effective methods to enhance empathy and compassion? 4) Will applying those methods result in an increased ability to demonstrate empathy and compassion in the real-world settings encountered by medical professionals, those in other professions, and in the population at large? The Sanford Institute will thus create a research environment that fosters a thorough understanding of the neural and behavioral basis of empathy and compassion and develops insights, tools, and methods to enhance the ability of humans to engage in these brain states. As such, the Institute is poised to make fundamental contributions to transforming the human condition.

BACKGROUND AND VISION

Empathy and Compassion: Definitions and Measures

Until very recently, empathy and compassion were defined largely, if not exclusively, in psychological terms and measured through observations of behaviors or through collection of self-reports of experimental subjects. The insights enabled follow-on studies using more sophisticated tools that allow for objective measures, as will be referenced below. Empathy is commonly defined with respect to both affective and cognitive components and can be considered as one manifestation of awareness (Hein and Singer, 2008; Thiriaux et al., 2016). ‘Affective empathy’ is variably defined as either “knowing how a patient feels” or actually “experiencing the feelings” of others; this type of empathy refers to “feeling into” someone else. Defined in this way, ‘affective’ empathy maintains the awareness that the one is separate from the other – i.e. one can place the self in the other without becoming the other, thus maintaining a heterocentric perspective. Alternatively, empathy may be defined as ‘cognitive empathy’ when one understands at an intellectual level that the patient has feelings without actually imagining or experiencing those feelings. Empathy is to be distinguished from ‘sympathy’ in which one feels with the other, feeling the same thing as the other at the same time. In sympathy, one loses the distinction between self and other - i.e. the other is now in and merged with the self – and attributes to one’s self the feelings of others (Thiriaux et al., 2016). Compassion can be defined as a sensitivity to the suffering of another accompanied by the motivation to alleviate that suffering (Klimecki and Singer, 2017). Thus, while empathy is constituted by cognitive and affective components, compassion can be viewed as being supported by both cognitive and motivational elements.

Though helpful for forming the discussion of the roles played by empathy and compassion in human experience the literature admits of several weaknesses. Indeed, a critical review of empirical studies on empathy in medical education points to failure to clearly define empathy, flaws in methodology used to assess it, and imprecision as to how empathy was measured. Most studies used quantitative rather than qualitative measures. Importantly, rarely did studies assess empathy in the real world context in which it is practiced (Sulzer et al., 2016). Compassion is even less well studied and the critique for empathy applies with equal force to compassion. Additional efforts will be required to address these deficits and thereby to place studies of empathy and compassion on the firm scientific ground needed to accurately assess their brain basis and the neural circuits involved, the extent to which these circuits and brain activations overlap with other cognitive as well emotional and motivational processes, to define methods by which empathy and compassion can be assessed in real-world settings and, importantly, to determine whether or not uncovering their neurobiological underpinnings will provide the insights needed to create training modalities and other possible interventions and to assess such methods for increasing their valence.

Neurobiological Bases for Empathy and Compassion: Defining the Neural Landscape

Recent years have seen an explosion of research interest in empathy and compassion within the neuroscience community. As never before neuroscientists are exploring these facets of brain and mind. In so doing they are beginning to address the deficits and questions just enumerated. The single most important reason for increased engagement of the neuroscience community has been the increased technical ability to image brain function during the performance of tasks that call upon the operation of mental states defined using psychological paradigms. Empathy and compassion could now be studied in real-time in individuals asked to perform in well-defined tasks created by neuropsychologists. Most informative have been studies using function Magnetic Resonance Imaging (fMRI), a tool that allows for detection of changes in activation of small brain regions using the change in blood oxygen level detection (BOLD) as the measure of activity with good anatomical and acceptable temporal resolutions. Complementing fMRI are EEG and other neurophysiology-based studies that provide precise temporal resolution and that through special methods allow for good spatial resolution, in some cases of even of deeply located neuronal populations.

Circuits Activated by Tasks Employing Empathy

Neurobiological studies of empathy have focused especially on empathy for pain. Tania Singer and her colleagues have provided key findings and their conclusions are supported work from a number of laboratories. Using paradigms in which a participant undergoes fMRI imaging while viewing pictures of painful situations or while experiencing pain or witnessing pain delivered to an affiliate in the same room, findings document activations in an empathy for pain core network that consists of the anterior insula (AI), inferior frontal cortex (IFG), and anterior middle cingulate cortex (aMCC) (Klimecki and Singer, 2017; Singer and Klimecki, 2014; Fan et al, 2011; Lamm et al, 2011). Activation of these regions is consistent with the role they play in mediating the response to a variety of interoceptive – i.e. inwardly felt stimuli, emotional experience and emotion related to pain perception (Craig, 2003; Lamm and Singer, 2010; Peyron et al, 2000; Singer et al, 2009). The surprising finding that these same regions are activated when pain is experienced vicariously leads to the suggestion that seeing another's pain, or emotional distress, might not just provoke activation of the same brain circuits but also create distress in the observer. While the suggestion must be addressed experimentally, the possibility of confusing the feelings of others with self – i.e. of interpreting the threat to another as a threat to oneself – is suggested. More generally, one could suggest that our ability to understand another's mental state depends on the ability to reproduce or simulate the state in our own brain. Recent studies suggest that different subregions within AI encode modality-specific information, such as disgust, unfairness, unpleasantness, as well as pain. As for pain, at least some aspects of empathy demonstrate sharing of brain activations by participants and an observed other (Klimecki and Singer, 2017).

Further pointing to the complexity of empathy, recent studies are able to discriminate brain activation patterns for affective and cognitive aspects of empathy. As indicated, the affective experience is linked to activation of the core network including AI/IFG and aMCC. Precisely how these regions are activated and the dynamic aspects of their connections with other co-activated regions is yet to be fully defined. Suffice it to say that while AI/IFG and aMCC are consistently engaged in tasks that tap into affective awareness, the networks in which they participate may well differentiate between emotional stressors, between emotional states in self versus others and facilitate motoric and cognitive processing of perceived threat. Less is known regarding the brain circuits whose activation might correspond to 'cognitive empathy' but there is evidence for a network that includes the ventromedial prefrontal cortex, temporo-parietal junction and medial temporal lobe (Hein and Singer, 2008). Perhaps most important is the view that the networks that mediate affective and cognitive empathy are dynamic and interactive. Indeed, it is possible that engaging circuits that mediate 'affective empathy' may allow for the more effective engagement of those that mediate 'cognitive empathy'. As one possibility, by enhancing the circuits that serve cognitive empathy it may be possible to avoid the 'empathic distress', or the 'emotional contagion', that can follow empathic engagement in which the empathizer shares the distress of the observed suffering other such that

what is happening to the other is also perceived as happening to the empathizer. The strong negative effect that follows motivates withdrawal from the situation to reduce distress. Therefore, not only does the empathizer fail to engage with the suffering other but suffers as a result of encountering them (Thirioux et al., 2016). One can readily envision that emotional distress compromises wellbeing and that its effects would be heightened in those whose profession or social environment routinely exposes them to suffering others. An important question is what brain circuits are important for avoiding emotional distress. As one possibility, enhancing the operation of those that mediate cognitive empathy may prove useful.

Circuits Activated by Tasks Employing Compassion

Much less research has focused on the neurobiological basis of compassion, but important insights have been forthcoming. Studies of compassion demonstrate increased activations in a number of brain regions that are distinct from those detected in studies of empathy. A longitudinal study of short-duration (one week) compassion training involving individuals naïve to such training, or a control group that underwent short-duration memory training. Participants viewed videos of others suffering or others involved in everyday activities. Videos, coincident with fMRI data collection, were viewed before and after training together and participants answered questionnaires to elicit subjective measures of feeling. Compassion training increased activation in the medial orbitofrontal cortex (mOFC), globus pallidus, putamen, ventral tegmentum and substantia nigra (Klimecki et al, 2013; Singer and Klimecki, 2014). Additional studies confirmed the involvement of mOFC, dorsal and ventral striatum, and identified activations in subgenual anterior cingulate cortex and nucleus accumbens (Engen and Singer, 2015). The findings are complemented by those in other studies examining participants adopting a compassionate or loving attitude toward pictures of individuals with intellectual disabilities or sad faces in which involvement of striatum and ventral tegmentum/substantia nigra was documented (Beauregard et al, 2009; Kim et al, 2009). Taken together, the regions represented are known to be engaged in affiliation, motor function, motivation and reward. Interestingly, it appears that the extent to which these circuits are activated is malleable and depends on social context. This raises the possibility that studies to further define empathy at the neurobiological level may enable not only better understanding of the networks involved but insights into how their activity may be modulated to increase empathy, thus maximizing the ability for individuals to more effectively and compassionately engage those in need while also reducing or eliminating the personal stress that attends empathic sharing of patient stress and suffering.

Training for Empathy and Compassion; Plasticity of Neural Circuits

The positive prosocial values for empathy and compassion encourage methods to enhance them. Important questions are: 1) can one create training programs and other interventions to enhance the function of neural circuits that mediate empathy and compassion; 2) can one create measures that demonstrate enhancement via both subjective measures and objective assessments of neural circuit function; and 3) will it be possible to employ brain-based measures to increase empathy and compassion, again as measured on both subjective and objective grounds. The answers to these questions will guide future attempts to build upon insights from neurobiological investigations into the nature of empathy and compassion for the purpose of increasing their valence in human interactions.

While investigations addressing the questions have only recently been undertaken, existing data point to the ability to employ the brain bases of empathy and compassion to increase the wellbeing of individuals and those with whom they interact. Indeed, though few studies address this topic, the results are quite encouraging. In an example referenced above, Singer and colleagues conducted longitudinal studies that employed compassion training, versus a control memory training cohort, and used the paradigm highlighted above in which participants viewed videos of others suffering or involved in everyday activities. In addition to demonstrating increased activation following compassion training of brain regions implicated in affiliation, motor function, motivation and reward, they reported that such participants experienced an increase in positive feelings for suffering others as well as for people depicted in early day situations (Klimecki et al, 2013). Moreover, such training did not change the degree to which participants shared

negative feelings, speaking to the desire that compassion training not encourage turning away from suffering. Thus, the study points to the possibility that compassion training can serve to strengthen the ability of individuals to cultivate prosocial behavior and possibly personal as well as extra-personal wellbeing (Klimecki and Singer, 2017).

In a related study, participants first engaged in an ‘empathy for suffering’ training followed by compassion training. The former consisted of participants imagining a series of people and tried to feel that their suffering was shared. Compassion training employed a paradigm that emphasized cultivation of benevolence and kindness toward suffering others. Memory training participants constituted a control group. Before training, at the midpoint of training between empathy training and compassion training and at the conclusion of training participants viewed videos of suffering individuals and people in everyday settings with concurrent fMRI scanning and followed by answering a questionnaire. The results were striking. Empathy training resulted in activation of those brain regions known to constitute the core for ‘empathy of pain’, including AI and ACC. Importantly, it also increased negative feelings for both suffering individuals and in those in everyday situations. The interpretation was that empathy training based on shared suffering engendered negative emotions (Klimecki et al, 2014). Remarkably, compassion training returned the level of negative feelings to baseline levels and increased positive feelings both for suffering others and those in everyday situations. Not surprisingly, the brain regions identified as a part of the compassion core network, including mOFC and striatum, showed increased activations after compassion training (Klimecki et al., 2014). The data are evidence that compassion training is able to counteract the effects of empathy that induces shared suffering. They support the idea that compassion training can play a powerful role in enhancing positive feelings toward others. They motivate studies to employ compassion training of those impacted by sharing the suffering of others to increase their ability engage in positive prosocial responses that constitute compassion. More generally, these studies support the idea that neural circuits that subserve empathy and compassion are plastic – i.e. are susceptible to training programs to enhance their efficacy, as measured neurobiologically as well as subjectively.

Will it be possible to further enhance training through interventions that build on real-time activation of brain circuits engaged in empathy and compassion? Again, the work in this area is at an early stage but some findings suggest that this will be possible. In one example, Birbaumer and colleagues asked if learned activation of the left AI could be used modulate the perception of visual emotional stimuli (Caria et al, 2010). Three groups were tested in four sessions of ~10 minutes each during a single day. In the active arm participants underwent fMRI scanning while being encouraged to increase the signal in their left AI, as registered in a picture of a thermometer providing specific feedback of their own fMRI signal in this region. In one control arm an unrelated fMRI signal was presented in the thermometer. In a second control group emotional imagery was used with a thermometer in view but in which no fMRI data were provided. Subjects observing their own fMRI signals were given continuously updated information on AI activation. Within sessions participants were asked to view sad or neutral faces and to indicate the extent to which they evoked negative feelings and arousal. All participants viewing their own fMRI signals were able to regulate the magnitude within 4 sessions. Training in the active group resulted in a significantly increased activation across sessions in the anterior portion of the left insula – i.e. the left AI. The control conditions failed to show an increase in the left AI, supporting the view that the change in fMRI signal was both feedback-mediated and region specific. Increased activity in the left AI in the active group, but not controls, was correlated with more negative scores for aversive stimuli (sad faces). This study thus demonstrates the ability using real time brain imaging over relatively short intervals to modulate a region that is part of the empathy core and shows that changes in activity induced by brief training results in subjective changes in the appraisal of emotionally negative stimuli (Caria et al, 2010). Other recent studies document the utility of real-time brain-based fMRI methods, including use of virtual reality environments, to impact both objective and subjective measures of brain function (Yao et al., 2016; Lorenzetti et al., 2018). The stage is set for studies to more comprehensively assess the ability to use such interventions to enhance the plasticity of neural circuits that participate in empathy and compassion.

Physician Empathy: Addressing a Crisis

Physician empathy and compassion are fundamental to the well-being of patients. Indeed, the data are persuasive that empathy powerfully impacts the physician-patient relationship and the quality of patient care (for reviews see Neumann et al., 2009; Roche et al., 2017). Improvements across a number of measures of patient health are positively correlated with physician empathy (e.g. Del Canale et al., 2012; Rakel et al., 2009; Ong et al., 2000). Importantly, objective measures of health outcomes also document benefit. For example, in studies of diabetes management, the patients of physicians who rank highly in measures of empathy suffer fewer acute disease complications and show better regulation of hemoglobin A1C and LDL levels than did those cared for by physicians with low scores for empathy (Hojat et al., 2011). Moreover, empathic engagement of patients may reduce professional stress and physician ‘burnout’ (Thiriaux et al., 2016). Among medical students, higher empathy scores predict sociability, teamwork and self-esteem (Berg et al., 2011).

A crisis in medicine threatens the wellbeing of physicians and, in so doing, the patient-physician relationship. It arises from physicians’ increasing reports of emotional exhaustion, depersonalization, and reduced sense of personal accomplishment and self-esteem. The symptoms are those of ‘Physician Burnout’, a condition that now impacts more than 50% of US physicians (for review see West et al., 2016). Those impacted report physical distress (abdominal and/or musculoskeletal pains), psychobehavioral distress (sleep disorders, hyperactivity, and addictive consumption of stimulants), and cognitive disorders (negative perceptions and attitudes). Burned out physicians feel empty and tired, distance themselves from others, and harbor feelings of failure. Recently surveyed, fully 15% of physicians reported thoughts of suicide. Not surprisingly, physicians suffering burnout are compromised not only in caring for themselves but also for their patients. Physician burnout thus results in a “pathology of care relationship” (Thiriaux et al., 2016). The root causes of burnout are many but fundamentally point to a disconnect between professional demands and supports – high workload, insufficient resources to accomplish the work required and failure to balance professional and personal goals all contribute (Thiriaux et al., 2016). Environmental, professional and personal challenges combine to render the physician vulnerable to burnout. Importantly, burnout also impacts physicians in training and other health care professionals. While healthcare institutions and societies increasingly recognize the burnout crisis, it is not clear that the measures undertaken to date will be successful, in most cases addressing symptoms rather than root causes. Absent a careful, comprehensive, scientific approach to understanding the causes and mechanisms of burnout and the initiation of measures to prevent or mitigate its effects, the crisis in medicine will continue, resulting in continued suffering of physicians and compromised patient care. The crisis demands a transformative response (West et al., 2016).

The physician burnout crisis echoes another one impacting medicine recognized more than 100 years ago. At the turn of the 20th century most medical schools were for-profit entities producing excess numbers of poorly trained physicians ill equipped to care for patients. The Flexner report, commissioned by the Carnegie Foundation, was a response to the widely held view that substandard medical schools, and their practices, should be eliminated and replaced by schools in which the scientific basis of medicine would drive the process of medical education (Ludmerer, 2011). The report was informed by the leading role played by German medical science. It served as a distillation of opinions of forward thinking academic physicians and existing best practices at a small number of academic medical schools, including Johns Hopkins. The report revolutionized medical education; today’s medical schools are a direct product of the report’s impact. Though much good was accomplished by the report’s emphasis on the science of medicine and the advancement of new knowledge, it had its critics. Among them, famed physicians Drs. William Osler and his student Harvey Cushing argued that scientific advances should not be the only or even the defining goal of medical education. While strongly supporting scientific discovery, they pointed to an

overriding mandate that focuses on the welfare of patients. Stated differently, patients should not be viewed as important for the advancement of science, but rather scientific advancement must be undertaken to serve patients.

Only recently have medical schools begun to focus on the importance of empathy and compassion as necessary complements to the scientific emphasis enjoined by the Flexner report. We hypothesize that empathy and compassion are essential not only for patient care but that they are indispensable for physician wellbeing. Indeed, we argue that training in empathy and compassion will empower physicians to secure their own wellbeing as well as that of their patients. Accordingly, we propose to respond to the crisis in medicine by developing and objectively evaluating training methods to measurably enhance empathy and compassion in medical students and physicians. The curricular innovation initiated by the Flexner report will now be complemented by innovations that enable student-physicians and their mentors to more effectively engage in awareness of self and others with the goal of producing well balanced physicians – individuals whose technical skills are matched by the ability to listen, empathize and compassionately respond.

Training for Physician Empathy and Compassion

Innovations in medical education are needed to support this transformation in medicine. We propose a robust, evidence-based program that through training enhances empathy and compassion. Beginning with student-physicians the program is intended to address physicians at all levels of training and practice. The program is rooted in several concepts. The *first* is that self-empathy and self-compassion enables one to become aware of one's own abilities, emotional state and environment. The *second* is that such self-knowledge will enable one to engage effectively in understanding others. The *third* is that training that supports the skillful adoption of empathic understanding and compassionate practice will equip medical students and physicians with the ability to more effectively care for patients. The *fourth* is that the development of optimal training methods requires rigorous objective measurements and evaluations of desired outcomes, including observations carried out in the context of clinical practice. *Fifth*, we argue that brain-based measures will prove useful by enabling real-time evaluation of the brain circuits that subserve empathy and compassionate behavior. Furthermore, we argue that brain-based measures will provide insights into the brain mechanisms that underlie physician empathy and compassion, their disruption in physician burnout, and to methods with which to restore normal circuit function in those suffering burnout. Taken together, we intend to intercept the current crisis in medicine via a program that transforms medical education through enhancing physician empathy and compassion. In so doing we propose not only to intercept the crisis but also to ensure a future for compassionate medical care.

We propose to create training programs that enhance physician self-awareness and amplify their ability to understand and care for their patients. Our initiative is a direct, powerful and timely response to the current crisis of care. Its initial focus will be the use of existing programs focused on behavioral training with demonstrated success in improving wellbeing. We will partner with the Compassion Institute in employing existing programs and developing new ones tailored to specific groups of physicians. Compassion Institute is a respected non-profit organization with a network of 225 highly trained compassion educators and over 15,000 alumni world-wide known for its flagship Compassion Cultivation Training© (CCT™) program developed in 2009 by Dr. Thupten Jinpa, an world-recognized expert in compassion training. CCT™ is generally considered the oldest and most widely cited compassion-based resiliency education program for high stress professionals in pro-social roles (law enforcement, health care, social services, education). CI's science-based adult education programs have demonstrated efficacy in raising metrics of emotional wellness, self-care, and work and life satisfaction while lowering metrics of depression, depersonalization, and work fatigue in studied populations (REFS). Through institutional partnership and a license agreement

with the Compassion Institute, we will develop training programs in empathy and compassion whose efficacy will be evaluated rigorously via behavioral, cognitive and physiological measures of self- and other-awareness, emotional resilience and professional satisfaction. We intend for student-physician training to be integrated into the formal medical education process and for other physician groups to be incorporated into voluntary program participation. Thus our programs will include: 1) an empathy and compassion training module to be introduced as part of the curriculum of medical education at the undergraduate or first or second year medical school level; 2) a second empathy and compassion-based master clinician mentorship program for 3rd year students; 3) resiliency and self-care focused trainings for residents and early career clinicians; 4) empathy and compassion-based mid-career physician wellness programming to open a path to addressing systemic challenges and mitigating burnout risk; and 5) a special protocol for bringing compassion metrics into organizational and economic systems at the institutional level, including programs that support physician-patient interpersonal communication. Each of these protocols will be assessed with respect to both subjective and objective measures of brain function. All programs that have been thoroughly tested and validated will bear the label of “the Sanford Method” and be offered outside the UC San Diego campus. Once generally available these programs will have the potential to revolutionize the fabric of medical education and positively impact the lives of physicians and those for whom they care. We aim to within 5 years to transform the medical school curriculum and the wellbeing of UC San Diego physician and within 10 years demonstrably impact the practice of medicine in the US and beyond.

Beyond the School of Medicine: Addressing the Needs of UCSD Students and Faculty

Given the crisis in medicine our attention will first be directed to medical students and physicians but the programs we develop are intended to engage the entire UC San Diego campus. We understand the compelling need for empathy and compassion in all facets of campus life. Accordingly, we propose to apply the lessons learned in medical education to support the general wellbeing of our students and faculty and intend from the outset to include them in our plans and program development. Thus, we will ensure that training programs shown to validly enhance medical student wellbeing are piloted in undergraduate students. As for medical students, we would innovate training programs that enable students to master and sustain the skills supporting empathy for self and others. In like manner, we will explore how these same programs, possibly with modifications suggested by those shown successful in practicing physicians, can be employed to support faculty across the campus. As for all such programs, we will employ objective and subjective measures to test for efficacy. We anticipate that diverse programs will be needed to address the different challenges and needs of diverse student groups and the faculty. Nevertheless, we argue that the outline proposed for medical students – objective measures to assess efficacy of training programs, optimization of training based on behavioral and physiological data, evaluation of efficacy in real-world contexts, and faculty mentors as role models – will serve the entire student body and their faculty mentors.

THE SANFORD INSTITUTE for EMPATHY AND COMPASSION

We envision a world in which medical care is delivered with great empathy and compassion, one in which student-physicians learn to master not only the technical challenges of medicine but to engage in medical practice using tools and skills that ensure the wellbeing of both physicians and patients. The Institute proposes to achieving this extraordinary vision and in so doing to transform medicine and society. Our programs will be located within a new Institute – the Sanford Institute for Empathy and Compassion. The Institute will consist of several elements, each of which is further described in separate sections. Here we provide a brief overview of each Center.

Center for Innovation in Medical Education: Integration of Novel Programs in Empathy and Compassion

This Center will create and house programs that train for empathy and compassion. We will begin by asking how using existing training programs in empathy and compassion influence student measures of compassion. Next, we will innovate new training methods and employ measures that report the emotional, cognitive and physiological impact of training on students. A composite of training methods that prove most effective in increasing measures of empathy and compassion will be to train a larger cohort of students; efficacy will be measured and the effects on students' patients will be assessed. Next, the impact of training will be examined at the brain level using fMRI and EEG to detect neural signals known to be linked to both affective and cognitive components of empathy and compassion. The existing literature, referenced above, will guide our first attempts but we expect to attract and recruit faculty with expertise in the neurobiology of empathy and compassion and related disciplines to spearhead this effort. We expect to show not only that training enhances relevant activations but to learn from the pattern and robustness of these activations how to increase training program efficacy. In particular, we understand the importance of training to enable physicians to adopt the perspective taking that enables them to both understand their patients and make objective evidence-based decisions regarding care. Finally, we will explore the fundamental brain mechanisms that underlie empathy and compassion, their disruption in the context of student-physician burnout, and the response of the latter to training methods.

This Center will also be responsible for the development and evaluation of programs to train residents and practicing physicians. Just as we focus on student-physicians, so also we must also focus on the next stage in their development and on faculty that mentor them. A key educational concept is that student behavior mirrors that of teachers. Positive senior student (i.e. intern and resident) and faculty role models for empathy and compassion will validate these values for students and provide them with real-world examples. This program therefore recognizes and responds to the challenges to empathy and compassion faced by faculty-physicians and aims to develop initiatives to enhance their skills. As outlined above, we will create training exercises that specifically address experienced physicians. We will ask if our innovations in training prove effective in the real-world clinical context in which faculty and students work collaboratively to care for patients. As above, we will measure the impact of training, with attention to both to self- and other-perceived success in demonstrating empathy and compassion.

To secure a robust future for the field of empathy and compassion training and research within the medical community we will initiate the Sanford Scholars in Compassion to develop the next generation of scholars and practitioners. The program would identify among recently admitted medical students those most interested and committed to studies of empathy and compassion. Selected students would receive partial tuition waivers. Sanford Scholars would pursue a specialized line of study, integrated within the standard curriculum, through which they would actively participate in research and training in empathy and compassion. An additional year of support would allow for a training program of sufficient duration and

rigor such that at the end of 5 years students will submit for faculty review a thesis reporting the results of their research. Successful completion of the program would result in the award of the MD as well as the soon to be proposed Masters in Empathy and Compassion Studies. Sanford Scholars will carry on the work of the Sanford Institute at medical schools and healthcare systems around the world. In so doing they will broadcast and amplify its advances and values. As to our knowledge there is no comparable program, the Sanford Scholars represents a unique innovation in medical education.

Center for Empathy in Health Innovation: Preparing Students for Medical Care in the Consumer-Driven Digital Age

Medical practice is being rapidly transformed by the movement of complex health products, devices, and services from oversight and availability through physicians to direct availability to patients and consumers. In the past, physicians largely supervised the generation and interpretation of a patient's health information. Now, not only do consumers have direct access to a greater volume and variety of personal health data than ever before, but the types of tests, devices, and products are also highly complex. For example, personal genome sequencing, continuous digital health monitors, microbiome profiling, and home-based lab tests – all of which provide granular, complex personal health data sets whose interpretation is continually evolving with advances in biomedical science – are now directly available to patients and consumers. This new landscape has resulted in shifting dynamics in the patient-physician relationship with the creation of new patient expectations and demands and the requirement that practicing physicians grapple with challenges to professional authority. The changing patient-physician dynamic enforces an urgent need to reimagine the training of medical students to address these challenges. Under the *Center for Empathy in Health Innovation*, the T. Denny Sanford Institute for Empathy and Compassion will respond through three programs that will enhance empathy and compassion in physicians-in-training who are at the vanguard of an era of patient empowerment and rapidly emerging health innovations. First, this Center will pursue a multidisciplinary research program focused on the impacts of emerging health innovations on physicians and their communication with patients. Despite the rapid evolution of these products and their increasingly wide availability, there has been little rigorous, systematic study of their effects on physicians, their communication with patients, or on the healthcare system. This research program will inform the development and ongoing refinement of our education and training programs. Moreover, this work will have a transformative effect on the practice of medicine through the development of new models of patient-physician communication that are aligned with empathic and compassionate medical care in the consumer-driven digital age. Second, this Center will design and implement a multi-component education program that will prepare future physicians to integrate and effectively communicate with patients about new health technologies. One component will be an *experiential learning program* that offers students the opportunity to personally undergo testing with a number of consumer health products and thereby to 'walk in the patient's shoes.' A second component will be a medical student *communication training laboratory* that will develop and use novel simulated patient cases focused on patients who present with personal data from complex consumer health tests. A third aim of this Center will be to develop a social sciences in medicine collaborative that will accelerate research at the intersection of empathy and technological innovation at UC San Diego. The initial focus will be on ethical and policy issues raised by the integration of technological innovations into medical practice. Through the work of this Center, the T. Denny Sanford Institute for Empathy and Compassion will serve as a national and international source of leadership on the empathic design and use of new health innovations.

Student-Run Free Clinic: Empathy and Compassion in Action

Showing that students can put empathy and compassion into practice will be key for the success of our efforts. The *Clinic* is an important venue for doing so. For many years it has introduced students to the care of the most vulnerable. In the proposed expansion of Clinic activities we will achieve two goals. First, students will experience first-hand the emotional and cognitive challenges that attend the physician-patient interaction. Second, we will test the efficacy of the innovative training methods developed under the *Center for Innovation in Medical Education* in a real-world clinical context. Thus, we objectively measure student-based mastery of empathy and compassion skills acquired through training; perceptions of their mastery by patients and faculty observers will also be evaluated. By reviewing performance with faculty mentors students will be provided with the feedback needed to understand performance. Measures to enhance future performance will be suggested, including access to additional training resources. The Clinic will thus provide a unique setting in which to evaluate and increase student skills.

Center for Mentorship and Communication in Medicine: Master Teachers and Communicators

Herein through two distinct efforts we will engage our clinical faculty in preparing student-physicians for their role as empathic and compassionate caregivers. In addition, we will enhance our faculty's ability to more effectively engage patients under their care.

Master Clinician Program

Despite significant advances in medical school curricula for the preclinical years, relatively few innovations have been made to the all-important third and fourth years. As a result of the failure to provide advanced training and mentorship in empathy and compassion students are not prepared to employ these important elements of the physician-patient experience in real-world clinical settings. Under the auspices of this *Center* we will establish the Sanford Master Clinician Program (MCP). Our efforts will build on the model piloted by the Pediatric MCP in the Department of Pediatrics at the UC San Diego School of Medicine. The Pediatric MCP has been lauded as an exemplary model for clinical education, fostering the development of empathic, communication, and clinical skills during these formative years. Individualized trainees are mentored by an experienced clinical educator; learn compassion and empathy in a real world clinical setting; develop clinical skills (physical examination, presentation, and clinical reasoning), and further interpersonal skills with a focus on the doctor-patient relationship. In short, the MCP serves as the real-life training lab to teach medical students both clinical medicine and the "art of medicine." Expanded across clinical specialties, the program has the potential to transform the manner in which we train future physicians, to the benefit of their patients and themselves.

Center for Interpersonal Communication

The ability to communicate effectively with patients is critical to physician efficacy. This *Center* will focus on skills to promote effective communication, thereby to enhance the patient experience and physician engagement. Ultimately we intend to improve patient cooperation and compliance with healthcare recommendations and to improve their health and wellbeing. Specialized training will be used to improve interpersonal communication skills. Beyond the demonstrable benefits to patients, improved interpersonal skills ameliorate are expected to reduce physician burnout. Consistent, compassion-oriented leadership training will also improve physician satisfaction and engagement.

Center for Research on Empathy and Compassion: Fundamental and Applied Scientific Approaches

The neurobiological focus on empathy and compassion, while not yet well developed, points to important opportunities to understand the bases for these important facets of human brain function. Indeed, it is difficult to conceive of an area for research whose research goals are more aligned with understanding the human condition and caring for those who are suffering from neglect, disease, or injustice. The Institute will engage in a robust research agenda carried out at both the basic and applied levels. A basic science

agenda will focus on the fundamental features of neural function in the context of paradigms that engage empathy and compassion. Important questions concern the locus of participating circuits, the interactions of participating circuits, the pattern and temporal facets of their engagement and, importantly, the extent to which they demonstrate plastic responses in the context of interventions that engage them. In so doing the Institute intends to reach out to colleagues across the spectrum of faculty engaged in the neurobiological, behavioral, and social sciences and engineering. We envision the need for new tools and a resulting harvest of new concepts. At the applied level we intend to learn about the brain changes that result from training in empathy and compassion and, in turn, to use basic science insights to enhance such programs. Our goal is to become the preeminent academic program in empathy and compassion science.

An important element within this Center will be the Sanford Fellows program under which young investigators, graduate students and postdoctoral fellows, will pursue research under the supervision of a faculty mentor into the science of empathy and compassion and its applications. The Sanford Fellows will represent the vanguard of the next generation of investigators whose career is devoted to these topics and, as such, will allow the Institute to propagate its research message and agenda within and beyond UC San Diego.

OBJECTIVES:

1. Launch an authoritative, internationally recognized center whose focus on the basic science and practice of empathy and compassion transforms the landscape for understanding and enhancing the skillful use of these fundamental features of brain function.
2. Create foundational resources for the education of physicians in their practice of self- and other-compassion, thus enhancing their ability to care effectively for patients.
3. Bring unprecedented insights to bear on the methods and measures used to educate medical students in empathy and compassion, thus transforming the curriculum of the UC San Diego School of Medicine.

LONG-TERM GOALS:

1. Spread and propagate the science and practice of empathy and compassion to medical schools across the US and internationally.
2. Provide a roadmap for disciplines beyond medicine as to how to study and cultivate empathy and compassion in practitioners of other professions, including education, business, law, etc.
3. To engage a wider international community and by demonstrating the effectiveness of our methods and strategies to encourage widespread investment in both the science and practice of empathy and compassion, thus transforming our world.

MILESTONES:

Year 1

- Announce Director of T. Denny Sanford Institute for Empathy and Compassion.
- Constitute a Steering Committee of Institute Center Chairs to assist in the day-to-day management of Institute operations.
- Form an Executive Council, consisting of both internal and external advisors and stakeholders including Institute Center Chairs.
- Request the formation of an Oversight Committee under the office of the Executive Vice Chancellor to provide guidance at the level of campus operations and planning.

- Aggressively reach out the UC San Diego community to survey interest in Institute goals and objectives and to enlist engagement in pursuing program plans.
- With faculty colleagues focus efforts to define the proper talent, ideal academic content and the optimal infrastructure for creating and sustaining the Institute.
- Initiate academic process to establish professorships to support the Institute's programs.
- Begin process of hiring key administrative positions.
- Begin to establish infrastructure supports for each of the program elements.
- Establish a planning committee for annual international conference.
- Create criteria and application requirements for: a) Sanford Research Scholars (i.e. pre- and postdoctoral researchers), and b) Sanford Scholars of Compassion (M.D. and M.D./Ph.D students).
- Establish liaison with institutional leaders within the Sanford Network regarding synergies and collaborations.
- Work with Campus Planning to identify space for Sanford Institute; initiate renovation.

Year 2

- Identify recruitment needs for existing and new faculty.
- Introduce first class of Sanford Research Fellows and Sanford Scholars of Compassion.
- Move Sanford Institute offices and support teams into newly renovated space.
- Hold first-annual, international conference to review the state-of-the-art research in empathy and compassion.
- Publicize seed funding opportunities for collaborative research projects

Year 3

- Evaluate existing training programs for medical students and implement findings in second-generation training programs for medical students.
- Hold second annual international conference on empathy and compassion.
- Select inter-institutional collaborations supported by Institute funding.
- Introduce second class of Sanford Scholars of Compassion.

Year 4

- Key recruits situated on campus and conducting research.
- Announce the second round of Sanford Research Fellows and the third round of Sanford Scholars of Compassion.
- Announce second round of applications for collaborative proposals.
- Identify opportunities for distributing updated training programs for medical students to collaborators and other participating institutions.

Year 5

- Programs and revised training programs distributed to medical schools in the US and internationally.

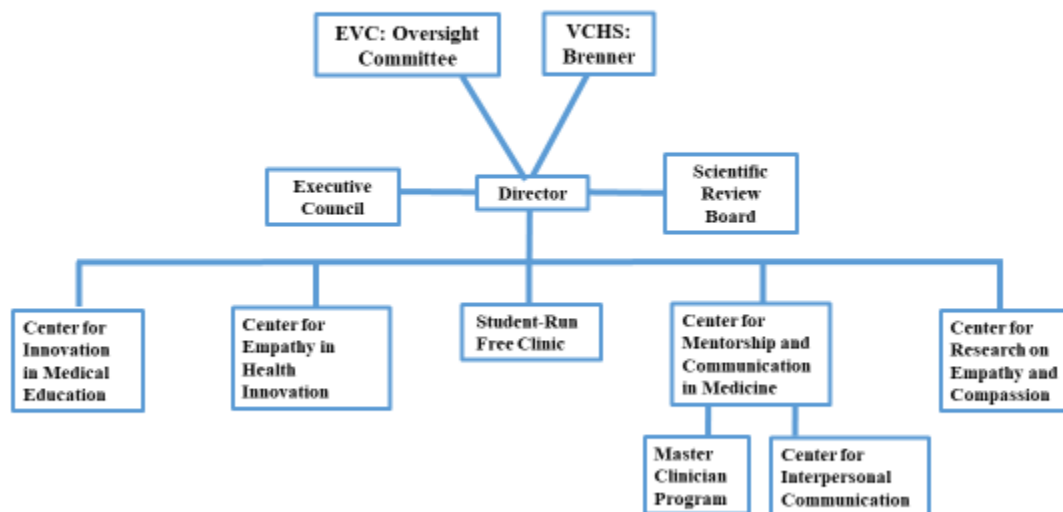
- First class of Sanford Compassion Scholars graduate.
- Award second round of inter-institutional collaborative research projects.
- Publish a five-year progress report that reviews all aspects of Institute operations and programmatic success, including analysis of expansion opportunities beyond medicine
- Engage internal and international external advisors to define a plan for the next five years.

INSTITUTE OPERATIONAL PLAN

The success of the Institute begins with understanding that it exists in the context of the entire UC San Diego campus. As such, it will enjoy access to, and benefit from, talented students and faculty across its many schools and divisions. To secure access, and to establish effective transdisciplinary working relationships, the Institute Director will report to the Vice Chancellor of the School of Medicine as well as to an Oversight Committee under the Executive Vice Chancellor. This dual reporting relationship will ensure accountability to the leadership of Schools within the Health Sciences as well as to the leadership of the campus in general. In addition, the Director will schedule regular meetings with the Chancellor to communicate progress and raise issues of general interest. Budgetary authority will fall under the VC for Health Sciences. Given the initial training focus on medical student education, and in consideration of the plans for extending training to medical residents and faculty, the Director will consult directly and routinely with the Dean of the School of Medicine. The Dean for Clinical Affairs, a member of the Executive Committee, will inform Institute activities for the training of medical faculty.

The Institute Director will be responsible for overall Institute operations and will oversee activities and financial affairs for each of the Institute's Centers, as referenced above. The Director will be assisted by an Administrator who will be responsible for the day-to-day management of Institute administrative personnel and will serve as Institute controller and budget manager. The organizational chart displays reporting relationships.

T. Denny Sanford Institute for Empathy and Compassion



Center for Innovation in Medical Education: Integration of Novel Programs in Empathy and Compassion

Executive Summary:

Medical students enter medicine with compassion and the desire to decrease suffering but the educational experience result in decreased empathy and compassion. We aim to increase medical student and faculty physician awareness of human suffering, acknowledging their unique ability to meaningfully address suffering through empathy and compassion. The Institute aims to transform the culture of medicine beginning with education of medical students and extending through all career stages. We will establish and implement training in empathy and compassion that is grounded in fundamental neuroscience discovery and through objective and subjective measures of self- and other-empathy and compassion. Through integrating empathy and compassion training across the continuum of medical education and practice we endeavor to significantly enhance student and faculty wellbeing and the care of their patients.

Background:

Medical students enter medicine with compassion and the desire to decrease suffering. Yet the educational systems that train student physicians may result in decreased empathy and compassion (Neumann et al., 2012). Some studies show that by the end of the third year of medical school empathy is significantly lower than it was at matriculation (see for example, Hojat et al., 2009). The desired outcome is that students already motivated by empathy and compassion are enabled to build on that foundation to become even more skillful in the ability to recognize suffering and respond to it.

We aim to increase medical student and faculty physician awareness of human suffering, acknowledging their unique ability to meaningfully address suffering through empathy and compassion. Over 90 years ago, Sir Francis Peabody famously stated, “The secret of the care of the patient is in caring for the patient.” Among the increasing pressures in medical education and medical practice, this point is all too often lost in the constant state of overly burdened schedules, extraordinary demands on knowledge and technical competence. The all too frequent result is emotional exhaustion and depersonalization (West et al., 2016; Thirieux et al., 2016). Although the formal curriculum espouses the virtues of caring for the patients, the “hidden curriculum” immerses medical students in the highly technical culture of medicine in ways that breeds anxiety and cynicism with the result that physicians are “othered” ourselves from patients.

The pressure, high stakes, and grueling hours needed to get through medical training result in students, trainees, and physicians adapting certain attitudes and behaviors that serve in self-preservation yet undermine the nature of the healing relationship. Half of physicians are burned out. Burn out due to job related stress is defined by feelings of emotional exhaustion, losing a sense of personal accomplishment, and detachment (West et al., 2016; Thirieux et al., 2016). In a system where demands on students and physicians are excessive, patients can become simply a number on a computer screen whose presence serves as a barrier to caring for oneself. However, students and physicians must learn to care for themselves so that they are able to care for others. Fortunately, the burnout suffered by medical students and physicians can be addressed through training programs that increase self-awareness. With training measures of burnout can be reduced and students and physicians can learn to practice both self-compassion and other-compassion. Importantly, advances in neuroscience promise to enhance such training to bring new skills to students and faculty resulting in increased ability to deliver care with both empathy and compassion. Our goal is to transform the culture of medicine from one of perceived self-sacrifice, cynicism and negative feelings towards patients to one which celebrates patient care as a positive experience for both the patient and their physician. Our hypothesis is that purposeful, scientifically grounded training in empathy and compassion is a necessary step for this transformation.

Vision:

The T. Denny Sanford Institute for Empathy and Compassion's ambitious goal to transform the culture of medicine will be driven by the establishment of neuroscientifically based training in empathy and compassion delivered during the entire course of medical school and extending to residents, fellows and faculty physicians. Thus, empathy and compassion training will be fully integrated across the continuum of medical education and practice. Programs adapted to the specifics of trainees at each of these levels will be launched and the impact of student and faculty wellbeing will be assessed using both subjective and objective measures. While initial efforts will focus on the Undergraduate Medical Education (UGME) level a parallel and quite similar process will separately focus on the Graduate Medical Education (GME) (residency) and faculty levels. Through systematic implementation of empathy and compassion training at defined points throughout the medical curriculum extending into mature clinical practice, we will create a paradigm that emphasizes a culture of compassion. This culture will demonstrate that empathy and compassion have cognitive, physiological, biological bases and that through training these elements of human brain and mind can be cultivated and enhanced. Through a dialogue that begins in the School of Medicine that extends to the neurosciences, psychiatry, neurobiology, psychology and the social neurosciences we will innovate creative and effective programs to engage and strengthen empathy and compassion. We expect to use existing tools and methods and to innovate new ones and to provide rigorous evidence-based support for the efficacy of training.

The chief functions of this Center include: 1) conduct baseline studies using measures of empathy and compassion; 2) identify key factors perceived as contributing to the erosion of empathy and compassion in medical students; 2) train medical students, residents, and faculty, particularly those with core teaching roles such as course directors, in empathy and compassion; 3) establish purposeful longitudinal relationships designed to increase mentoring by those faculty identified as being outstanding role models of humanism and compassion; 4) create a culture of 'compassion in medical education'; 5) lead the field of medicine education in purposefully cultivating self-compassion as well as compassion for others; 6) partner with other Institute partners to rigorously assess the impact of interventions; 7) create a leading center for medical education outcomes assessment regarding compassion in medical education and medical practice; 8) collaborate with other medical schools to enhance training in empathy and compassion; 9) address the role of wellness, compassion, and self-compassion throughout the physician's career; and 10) participate in conferences and through publications to share best practices and findings.

Objectives:

- Conduct needs assessment.
- Collect baseline data using existing tools, including the Jefferson Survey of Empathy.
- Collaboratively create and implement programs that value and train for empathy and compassion.
- Create the awareness that empathy and compassion have a neurobiologic basis and can be studied, learned, and cultivated.
- Serve as the national leader in implementing compassion training in medical education and medical practice.
- Participate in systematic rigorous outcomes assessment, iterative change, feedback, and adaptation of training methods and measures.
- Create training programs that can be exported to medical schools throughout the country.

- Increase national and international awareness of the need for and possibility of purposefully creating empathy and compassion in medical education.
- Create a robust culture of compassion in medicine.

Long-term Goals:

- Extend programs to other medical schools.
- Extend programs to students in non-medical disciplines.
- Establish national and international best practices for empathy and compassion training.
- Disseminate information learned from the programs through publication of findings in scholarly journals.

Milestones:

Year 1

- Conduct needs assessment with key stakeholders including medical students, course directors, clerkship directors, faculty, deans to assess perception of current practices that introduce or cultivate empathy or compassion and ask what they view as important and useful in building a curriculum to cultivate empathy and compassion.
- Pilot a training program in compassion/empathy for medical students to assess feasibility, applicability and ability to measure existing subjective changes in response to this intervention.
- After reviewing data from the pilot, adapt and enhance initial training methods introduce to a larger number of medical students to assess training efficacy using existing and innovative subjective measures, thus validating initial training methods.
- Identify/train key personnel in best practices in compassion/empathy.
- Establish liaison with Institute research personnel.

Year 2

- Introduce compassion/empathy training into core curriculum during preclinical and clinical years.
- Session on self-compassion to second-year medical student class prior to Step 1
- Session on compassion/empathy to rising third-year medical students at Clinical Transitions Week
- Establish compassion scholars (area of concentration) at the medical student level
- Design reflection activities relating to program
- Collect intervention data from medical students

Year 3

- Design online modules covering compassion/empathy to compliment hands-on sessions
- Create electives in the curriculum of the School of Medicine that focus on empathy and compassion

- Expand and formalize compassion/empathy into key core curriculum during preclinical Years.
- Expand and formalize compassion/empathy into key core curriculum during clinical Years.
- Analyze the impact of training and publish findings.

Year 4 and 5

- Implement online modules on empathy and compassion and study effectiveness.
- Modify, expand and formalize compassion/empathy into key core curriculum during preclinical and clinical years.
- Continue to track learners and obtain data from the graduating class that would have completed the program across all four years.
- Seek collaborators at other medical schools to disseminate training methods.

Center Management and Operations:

The Center Associate Director will work closely with the Associate Dean of Undergraduate Medical Education, the Associate Dean of Admissions and Student Affairs, the Director of Student Wellness, as well as pre-clinical core clerkship faculty, and elective faculty. The Center Associate Director will report to the Institute Director to access Institute resources, especially with respect to the research agenda.

The Center for Empathy in Health Innovation

Executive Summary:

Under the *Center for Empathy in Health Innovation*, the T. Denny Sanford Institute for Empathy and Compassion will advance programs to enhance empathy and compassion in physicians-in-training who are at the vanguard of an era of patient empowerment and rapidly emerging health innovations. This Center will pursue a multidisciplinary research program focused on the impacts of emerging health innovations on physicians and their communication with patients; design and implement a multi-component education program that will prepare future physicians to integrate and effectively communicate with patients about new health technologies; and develop a social sciences in medicine collaborative that will accelerate research at the intersection of empathy and technological innovation at UC San Diego. Through the work of this Center, the T. Denny Sanford Institute for Empathy and Compassion will serve as a national and international source of leadership on the empathic design and use of new health innovations.

Background:

Medical practice is being rapidly transformed by the movement of complex health products, devices, and services from oversight and availability through physicians to direct availability to patients and consumers. In the past, physicians largely supervised the generation and interpretation of a patient's health information. Now, not only do consumers have direct access to a greater volume and variety of personal health data than ever before, but the types of tests, devices, and products are also highly complex. For example, personal genome sequencing (Bloss et al., 2011; van der Wouden et al., 2016), continuous digital health monitors (Schukat et al., 2016), microbiome profiling (Del Savio et al., 2017), and home-based lab tests (Topol et al., 2015) – all of which provide granular, complex personal health data sets whose interpretation is continually evolving with advances in biomedical science – are now directly available to patients and consumers (Regaldo, 2019; Shankar, 2017). This new landscape has resulted in shifting dynamics in the patient-physician relationship with the creation of new patient expectations and demands and the requirement that practicing physicians grapple with challenges to professional authority. The changing patient-physician dynamic enforces an urgent need to reimagine the training of medical students to address these challenges. In short, new health technologies and the movement toward consumer-driven medicine have emerged to significantly impact the roles to be played by the next generation of healthcare providers. Addressing these challenges requires due consideration as to how to inform and support new physicians with the skills needed to function in this new environment while maintaining their ability to empathically and compassionately care for patients.

Vision:

The T. Denny Sanford Institute for Empathy and Compassion aims to become the foremost entity for research in empathy and compassion and for translation of research advances to the training of physicians. Under the *Center for Empathy in Health Innovation*, it will advance programs to enhance empathy and compassion in physicians-in-training who are at the vanguard of an era of patient empowerment and rapidly emerging health innovations. The first objective of this Center will be to bring together transdisciplinary faculty from medicine, social sciences, engineering, data science, and business to pursue a rigorous research program focused on the impacts of emerging health innovations on physicians and their communication with patients. Despite the rapid evolution of new health products and tests and their increasingly wide availability direct-to-consumer, there has been little rigorous, systematic study of the effects of these trends on physicians, their relationship to patients, or on the healthcare system. The work of this Center aims to have a transformative effect on the practice of medicine through the development of new models of patient-

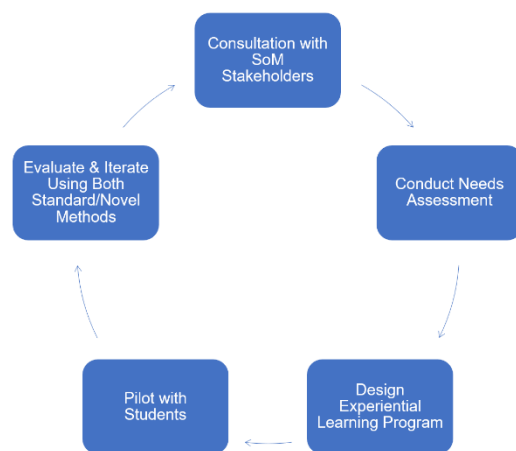
physician communication that are aligned with empathic and compassionate medical care in the consumer-driven digital age.

The second objective of this Center will be to design and implement a multi-component education program that will prepare future physicians not only to function in this new landscape, but to thrive in their abilities to interface with new technologies and to bring empathy and compassion to their interactions with patients about these innovations. The design of the education program will be informed by Center research. In addition, each component of the education program will be systematically studied to track outcomes, including increased student knowledge and competence with respect to specific emerging health innovations, as well as enhanced student abilities to demonstrate empathic, compassionate, and effective communication about new products and tools. One planned component of the program is an *experiential learning program* that will offer students the opportunity to personally undergo testing with a number of consumer health products and thereby to ‘walk in the patient’s shoes’ (see Figure 1). The choice of which tests and/or devices to offer will be informed by input from School of Medicine faculty and students. Given the wide availability of direct-to-consumer personal genetic information and the increasing use of genomic information in healthcare decision-making, we will seek to gain faculty and student support for making this the initial technology of focus. With each type of test or device offered through the experiential learning program, however, students will gain appreciation for what the technology measures and how it works, what data is collected and how it is interpreted, the significance of the insights that come from data analysis, and what and how information should be transmitted.

Students will become aware through personal experience of the benefits and risks that attend availability of previously unknown health-relevant information. We expect this experience to sensitize them to the context in which such data is shared and to increase their motivation to learn how to respond with empathy and compassion to patients who have had these tests. This component will also stress the cyclic and iterative nature of health technology development and will thereby provide students with the skills needed for life-long competence in evaluating technical advances and the ability to communicate new types of data made available to patients in the future. As previously stated, outcomes will be systematically and rigorously evaluated using a variety of methods including longitudinal cohort designs and validated measures of constructs of interest. A second planned component of the education program will be a medical student *communication training laboratory* that will develop and use novel simulated patient cases (experienced actors who have been carefully trained to simulate an actual patient) focused on patients who present with personal data from complex consumer health tests. Through this program, students will have the opportunity to hone communication skills for these situations and apply the empathy and compassion training they receive through other Institute initiatives. Again, outcomes will be systematically evaluated using novel methods such as video analysis and coding, continuous vital sign monitoring during communication using biosensors, and video elicitation interviews.

Importantly, while the Center’s initial education focus will be medical students, as the Center develops, its focus will be extended next to more advanced students and practicing physicians and then to trainees in other health-related (public health), as well as non-health related disciplines. Regarding the latter, we will innovate approaches to the training of compassion and empathy, as well as social responsibility, for

Figure 1. Process for Experiential Learning Program Development



engineering, computer science, and data science students. While physicians work with individual patients and their data, engineers, computer scientists, and data scientists work with personal data from, potentially, millions of people. Thus, integrating compassion, empathy, and social responsibility in the training programs for these disciplines is not only innovative, but in fact a responsibility for institutions of higher education in promoting the greater good and betterment of society.

The third objective of this Center will be to initiate the development of a social sciences in medicine collaborative focused on the ethical and policy implications of health innovations. The initial focus will be on ethical and policy issues raised by the integration of technological innovations into medical practice and, in the future, public health. This collaborative will accelerate research at the intersection of empathy and technological innovation at UC San Diego. In the long term, we envision that this collaborative will grow to establish UC San Diego as the internationally recognized center of excellence for research on the empathic design and use of new health innovations and, more broadly, the social sciences in medicine. Ultimately, through the work of this Center, the T. Denny Sanford Institute for Empathy and Compassion will serve as a national and international source of leadership on the empathic design and use of new health innovations.

Objectives:

- Materially advance progress in understanding the impacts of health, science, and technological innovations on physicians and the patient-physician relationship
- In so doing create an exciting, rigorous research environment for the social sciences in medicine at UC San Diego
- Develop tools and methods for the systematic study of empathy and compassion in the context of new technology development and use (e.g., patient-physician communication)
- Translate insights derived from initial research efforts into novel, next generation education and training programs for medical students and faculty
- Demonstrably enhance the ability of UC San Diego medical students and faculty to understand and use new technologies and to bring empathy and compassion to their interactions with patients about these innovations
- Define the infrastructure needed to sustain both social sciences in medicine research efforts and their translation to the medical community and beyond

Long-term Goals:

- Expand the Center mission and apply initial insights in student-physicians to the training of students from other health-related disciplines (public health, pharmacy) and from technology and data-focused disciplines (engineering, computer science, data science)
- Export and test the efficacy of methods, tools, and education programs developed at UC San Diego in other medical schools, both in the United States and elsewhere
- Establish UC San Diego as the internationally recognized center of excellence for research on the empathic design and use of new health innovations and, more broadly, the social sciences in medicine

Milestones:

Year 1

- Recruit and hire Center program manager and administrative supports

- Recruit pre- and postdoctoral fellows, research scientists, and early career faculty to support Center research and education programs
- Establish a cross-campus, multidisciplinary internal advisory board (IAB) to inform research efforts and strategy
- Establish an external advisory board (EAB) to inform research efforts and strategy
- Participate in the Institute's centralized seed grant program
- Establish process for faculty affiliate membership
- Develop and refine plans for the Center research program focused on the impacts of emerging health innovations on physicians and their communication with patients
- Conduct a needs assessment for medical student education programs in health innovations
- Define infrastructure needs for communication training laboratory
- Assemble a committee on experiential learning (CEL) comprised of medical students, School of Medicine faculty and leadership, and Division of Social Sciences (e.g., Department of Education Studies) faculty to advise on the design of the medical student experiential learning program and to determine which types of personal health technologies to make available to students
- Consult with the developers of Sanford Harmony to inform Center activities and goals

Year 2

- Participate in the Institute's centralized seed grant program
- Initiate research projects focused on the impacts of emerging health innovations on physicians and their communication with patients
- Establish methods for evaluating research projects conducted under the auspices of the Center
- Identify topic areas and initiate development of simulated patient cases
- Pilot and systematically evaluate outcomes of the communication training laboratory with medical students
- Design initial prototype of the medical student experiential learning program and solicit input from medical students and School of Medicine faculty and leadership

Year 3

- Recruit second round of pre- and postdoctoral fellows, research scientists, and early career faculty (Sanford Innovation Fellows) to support Center research and education programs
- Participate in the Institute's centralized seed grant program
- Identify opportunities to enhance, establish, and sustain infrastructure at UC San Diego in the emerging fields of social science in medicine and narrative medicine
- Evaluate overall Center progress to date and identify opportunities to improve efficiency using quality improvement principles
- Conduct horizon scanning and a systematic design thinking process to review the state of the field and identify new opportunities for expanded Center research and education activities
- Evaluate the progress of initial research projects conducted under the auspices of the Center
- Disseminate preliminary findings from Center research projects
- Pilot and systematically evaluate outcomes of the experiential learning program with medical students

- Based on systematic evaluation, refine and scale up communication training laboratory with medical students

Year 4

- Participate in the Institute's centralized seed grant program
- Evaluate the progress of initial research projects conducted under the auspices of the Center
- Initiate follow-up research projects focused on the impacts of emerging health innovations on physicians and their communication with patients that build on findings from initial projects
- Disseminate findings from initial Center research projects
- Conduct a workshop with international patient-physician communication experts to inform the development of new models of patient-physician communication
- Based on systematic evaluation, refine and scale up experiential learning program with medical students
- Conduct the activities of the communication training laboratory with medical students at steady state with ongoing evaluation to motivate continuous improvement
- Explore and identify opportunities to expand the Center mission and apply insights from years 1-3 to the training of other health sciences students (public health, pharmacy)
- Identify opportunities for distributing education programs for medical students to collaborators, other participating institutions, and among national and international organizations/institutions involved in the training of physicians
- Conduct a needs assessment among practicing physicians to inform the design of resources to support practicing physicians faced with patients who present with complex consumer health tests

Year 5

- Publish a five-year progress report that reviews: a) research methods and projects, b) education activities and programs, c) basic social science findings, d) how basic social science insights were used to inform iterations on education programs or development of new programs, f) measured impact of education programs on medical student empathic and compassionate care of patients, and g) initial results from distributing training programs to institutions beyond UC San Diego
- Engage internal and external advisors to define a plan for the next 5 years of Center activities
- Participate in the Institute's centralized seed grant program
- Evaluate the progress of follow-up research projects conducted under the auspices of the Center
- Disseminate findings from completed Center research projects
- Conduct the activities of the experiential learning program with medical students at steady state with ongoing evaluation to motivate continuous improvement
- Conduct the activities of the communication training laboratory with medical students at steady state with ongoing evaluation to motivate continuous improvement
- Assess the feasibility and utility of degree programs at UC San Diego School of Medicine in the emerging fields of social science in medicine and narrative medicine with a focus on empathy, compassion and emerging health innovations

- Explore and identify opportunities to appropriately expand the Center mission and apply insights from years 1-4 to the training of students from technology and data-focused disciplines (engineering, computer science, data science)
- Design a prototype resource for practicing physicians to aid them in handling patient cases involving complex consumer health tests

Center Management and Operations:

The operation of this Center will be overseen by the Center Director who will report to the Institute Director, Executive Council, and Scientific Review Board. The Center Director and Center Program Manager will be responsible for the day-to-day management of Center resources and finances and for the supervision of Center research faculty, staff, students, and administrative personnel.

The Student-run Free Clinic Compassion in Action

Executive Summary:

The Free Clinic provides students with an excellent opportunity to engage in the compassionate care of the underserved. UC San Diego led in efforts to establish such clinics and through its efforts has supported the development of a national network of such clinics. Virtually all students attend the Clinic and their experiences are extremely rewarding with students reporting that clinic attendance increases their wellbeing and ability to engage patients with empathy and compassion. The Clinic will continue to serve to enhance our students' learning and patient care and will provide a vital locus for examining the impact of empathy and compassion training. Existing and novel objective and subjective measures will be used to assess student empathy and compassion and for their ability to care that is both compassionate and effective.

Background:

The UC San Diego Student-run Free Clinic Project was formed in 1997 in a small room in the basement of a church (Beck 2005). We have over the last 22 years grown to be the largest Student-run Clinic in the US (Smith, Thomas, et al 2014) and now provide high quality primary care, specialty care, legal services, dentistry, social work, acupuncture, pharmacy, and laboratory services on-site. Over 2000 medical students, in addition to thousands of premedical students, dental, and pharmacy students, have been trained in the Free Clinic (Smith, Yoon et al 2014). Medical students and other trainees report that the Free Clinic is where they learned compassion. They describe the Free Clinic as a place where they see compassion not as a vague concept but as a core belief and practice, a place where they feel they are able to leave their books and classrooms to become a part of the community. They see compassion embodied in real life through the core faculty, a large number of volunteer physicians, as well as their classmates who have chosen to volunteer to serve those in need.

The Free Clinic has become the by far the largest elective class at UC San Diego School of Medicine with ~ 90% of medical students choosing to volunteer to serve those who have fallen through the traditional health care safety net. UC San Diego medical students report that the Free Clinic is a valuable educational experience and that teaching is excellent (Smith, et al 2012). Perhaps more importantly, they report it helps keep them connected with their sense of purpose while in medical school (Smith, et al 2012). The Clinic is often stated as having influenced their decision to come to UC San Diego School of Medicine (Smith, et al 2012). Previous studies have documented that participation in the Free Clinic results in increased knowledge, skills, attitudes, and self-efficacy with the underserved, interest in working with the underserved, and interest in primary care (Smith, Yoon, et al 2014). National studies of graduating seniors demonstrate that those who have participated in a Free Clinic while in medical school are more likely to become or remain interested in serving the underserved (Xierali, et al 2016).

In the Clinic students learn that their presence matters and that they contribute meaningfully to the administration and the delivery of health care in the community. They continually assess their work, the systems in which they practice, the outcomes of their clinical care, and make suggestions for improvement. Despite serving patients who are most likely to be affected by health disparities, the clinical outcomes for patients of the Student-run Free Clinic meet or exceed national standards in diabetes, hypertension, and hyperlipidemia (Smith, Marrone, et al 2014, Smith, et al 2017, Rojas, et al 2015).

We participated in creating a national movement of Student-run Free Clinics by founding the Society of Student-run Free Clinic (SSRFC) which now has an annual conference of over 600 medical student leaders from across the country. It provides a network that promotes best practices and provides support for students and faculty doing this work (Smith, Yoon, et al 2014; Smith, Thomas et al 2014 & SSRFC website). We

have documented that over 75% of medical schools now have Student-run Clinics (Smith, Thomas, et al 2014). Under the SSRFC we created a national faculty development program in working with the underserved that has trained over 100 faculty at the time of the last publication of findings and by now trained over 200 faculty in underserved medicine (Beck, et al 2008). Over 20 institutions started their own Student-run Clinics inspired by our work and model of care.

Compassion is the desire to act to decrease suffering. Student-run Free Clinics provide a venue in which medical students are exposed to people who are not being served by the traditional health care system have significant suffering. In this setting students are enabled to act to address this suffering in a meaningful way (Smith, Thomas, et al 2014). They report that they feel a part of the community and have something of value to offer those in need. When attending the Free Clinic, and in spite of the overwhelming rigors of medical education, students are able to take their focus off studying, tests, and grades to remember that the profession of medicine is ultimately about service to others – the reason that they elected a career in medicine.

Vision:

The Student-run Free Clinic seeks to provide the context in which trainees are enabled to engage in meaningful, real-world experiences of empathy and compassion. We aim to train students, residents, faculty, and interdisciplinary partners in the best educational and scientific practices of empathy and compassion and to provide a venue for them to implement the empathy and compassion training that they receive. Free Clinic patients face significant healthcare challenges and have been unable to receive the resources needed. Accordingly, students and faculty partner with the patient to assess what is most important, to address their acute and chronic health care needs, and to do so in a context that often span a broad range of biopsychosocial components.

When students and faculty focus a visit purposefully on building empathy and compassion for themselves and their patient, they begin to see themselves with a shared human experience, and as health care providers have the desire to act to relieve human suffering. In Student-run Free Clinics, students learn that a simple medical order placed in a traditional medical setting will not always result in the relief of suffering in their patients. They will routinely interact with diabetes patients who cannot afford insulin, with asthma patients who cannot afford inhalers, with depression sufferers who cannot afford therapy, and even with cancer patients who cannot afford treatment. Thus, we aim to cultivate a culture where students think beyond traditional constraints to partner with patients to alleviate suffering, and in so doing integrate their compassion training into clinical practice. We anticipate that this culture and practice will influence the way they interact with patients not only in the Free Clinic but will expand well beyond into the way they approach their care for patients in more traditional health care systems.

The chief functions of this Center include: 1) providing training in empathy and compassion in a service-learning environment; 2) empowering students to provide outstanding clinical care to those unable to access to care with compassion; 3) creating a real -world culture of compassion for self and others in which students can train and thrive; 4) enable faculty, students, and staff to embody and role model self-compassion and compassion for others; 5) provide a venue where innovative pilot programs can be tested; 6) attract outstanding medical students and faculty; and 7) provide a location for longitudinal relationships to form between students and patients with close faculty supervision. Each of these aims will be examined through the collection of longitudinal data using existing instruments and well as instruments we will create within the Center for Research. Thus, initially we will employ tools that measure student empathy, including the Jefferson Scale of Physician Empathy (JSPE) and the Interpersonal Reactive Index (IRI), and for patients the Jefferson Scale of Patient Perceptions of Physician Empathy (JSPPE). These measures are widely used to assess empathy among medical students and to assess patient responses to student contact (Berg et al., 2011; Thiriaux et al, 2016). We will endeavor to define objective and subjective measures of

empathy and compassion in Free Clinic attendees. Thus, the impact of empathy and compassion training will be assessed before after training and before students attend the Free Clinic and then at intervals after initiating Free Clinic attendance. Based on initial findings, and the willingness of students to participate in the development of new tools and the use of neurophysiological measures of empathy and compassion as outlined in the Institute Overview, we will innovate new methods and measures.

Objectives:

- Train students, faculty, and staff in empathy and compassion.
- Create a culture of compassion where trainees and faculty seek to think outside the usual parameters to work towards decreasing human suffering in their patients.
- Create an environment where trainees and faculty practice medicine with a purposeful focus on empathy and compassion for self and others.
- Expand clinic hours to create a venue for medical students to practice compassion for underserved patients.
- Measure outcomes for the impact of empathy and compassion training.

Long-term goals:

- Collaborate with other medical schools and Student-run Free Clinics to train and implement similar programs.
- Recruit former students who have gone through the Sanford Empathy and Compassion training program as faculty.
- Establish permanent locations for the UC San Diego Student-run Free Clinic Project, providing long-term stability allowing for growth and expansion in hours of service, reach, and impact.
- Create and employ novel objective and subjective measures to measure the impact of empathy and compassion training on the performance of students in the Clinic and the impact of Clinic attendance on these measures.

Milestones:

Year 1

- Identify/train key personnel in best practices in empathy and compassion.
- Collaborate with Sanford Institute research personnel to identify key variables to measure, including for students the JSPE and IRI and for patients the JSPPPE.
- Conduct needs assessment from students and patients regarding areas for focus and growth in compassion.
- Obtain baseline data and initial longitudinal data from existing medical students.
- Pilot longitudinal student-patient pairings to increase empathy and compassion in the Student-run Free Clinic Project while obtaining feedback.
- Expand clinic hours to allow space for additional training opportunities.

Year 2

- Expand clinic hours to allow space for additional training opportunities.

- Formalize and integrate empathy and compassion into all free clinic-related classes during preclinical and clinical training.
- Formalize and expand longitudinal student-patient pairing to increase empathy and compassion.
- Collaborate with Sanford Empathy and Compassion Institute research personnel to Innovate and measure outcomes.
- Conduct formalized reflection activities regarding compassion.
- Collect intervention data and feedback.
- Analyze student, faculty, and patient reflections on empathy and compassion

Year 3

- Host additional School of Medicine electives that allow students to be immersed in building empathy and compassion.
- Analyze and disseminate data by presenting at national conferences regarding Student-run Free Clinics as a meaningful component of training students and faculty in empathy and compassion.
- Publish findings in peer-reviewed journals.

Year 4

- Host and educate students who elect to participate in the Compassion Scholarly Area of concentration.
- Collaborate with other medical schools regarding training students and faculty in compassion within Student-run Free Clinics.
- Continue to track learners throughout their medical education journey.

Year 5

- Analyze and disseminate data from the graduating class that would have completed the program across all four years.
- Assess impact of compassion training on interns who have graduated from School of Medicine.

Center Management and Operations:

The Free Clinic will have an Associate Director of Empathy and Compassion who will oversee the needs assessment, implementation, and evaluation of these efforts. They will report to the Director of the Institute of Empathy and Compassion. In particular, this person will be charged with initiating and overseeing the research initiatives linked to understanding and enhancing empathy and compassion in students. This person will collaborate closely with the Clinic Director, core Free Clinic faculty members as well as the Associate Dean of Undergraduate Medical Education. The Associate Director, with administrative support, will assist in linking Institute objectives with the Director of the Clinic. The Free Clinic core faculty and medical students will continue to run the Free Clinic and meet regularly with Compassion Institute stakeholders to work collaboratively towards creating the culture of self-compassion and compassion for others.

Center for Mentorship and Communication in Medical Education:

Master Clinician Program

Executive Summary:

The Master Clinician Program (MCP) at the T. Denny Sanford Institute for Empathy and Compassion will transform the manner in which we train future physicians. Designed to combat the unique challenges of practicing medicine in the 21st century which has led to high rates of physician burnout and suboptimal patient care, the program delivers individualized mentorship to medical students from experienced Master Clinicians, with an emphasis on modeling empathetic and compassionate care. A pilot MCP program in the UCSD Department of Pediatrics has demonstrated the effectiveness of this approach in a real-life clinical setting. Future efforts will optimize the program and expand it to all core clinical clerkships, customizing the experience on each unique rotation. Data from the Sanford MCP will be published so the information may be disseminated to other institutions and become the gold standard for clinical training in medical school and beyond.

Background:

The landscape of medical education is evolving. A convergence of issues has led us to a crossroads as to how we train the next generation of compassionate physicians to provide empathic, high quality care to our patients. Over the past decade, medical schools have redesigned their preclinical curricula, placing a stronger emphasis on the doctor-patient relationship, self-directed learning and clinical correlations to pathophysiologic principles. At UCSD, this is manifested in the preclinical Integrated Scientific Curriculum which focuses on the importance of combining robust scientific foundations and a humanistic, biopsychosocial approach to the practice of medicine. However, despite these advances in the preclinical years, relatively few innovations have been made to the all-important 3rd and 4th years of medical school. In fact, curricula for the clinical years have remained essentially unchanged for the past century. As a result, particularly given the evolution of new challenges to medical practice [e.g. the electronic medical record (EMR), relative value units (RVU), etc.], there exist numerous educational gaps and missed opportunities. The consequence is a disconnect between the principles of compassion/empathy and the actual practice of medicine, leading to high rates of physician burnout and suboptimal patient care. There exists an urgent need to translate the lessons learned from classroom and simulated patient interactions to the real word setting in which medical students will practice. Only in this manner, will future physicians learn to deliver outstanding, empathic and compassionate clinical care.

Vision of the Center:

Under the auspices of the Center for Mentorship and Communication in Education, we propose to establish the Sanford Master Clinician Program (MCP), building on the model piloted by the Pediatric MCP in the Department of Pediatrics at the UC San Diego School of Medicine. The Pediatric MCP has been lauded as an exemplary model for clinical education, fostering the development of empathic, communication, and clinical skills during these formative years. Individualized trainees are: (1) mentored by an experienced clinical educator; (2) learn compassion and empathy in a real world clinical setting; (3) develop clinical skills (physical examination, presentation, and clinical reasoning); and (4) further develop interpersonal skills with a focus on the doctor-patient relationship. In short, the MCP serves as the real-life training lab to teach medical students both clinical medicine and the “art of medicine.” Extended across additional clinical specialties, the program has the potential to transform the manner in which we train future physicians, to the benefit of patients, physicians and society as a whole.

Preliminary Data and Conclusions:

The pilot MCP program was launched in the UCSD Department of Pediatrics in the 2016-2017 academic year. To evaluate the effectiveness of the program, a research team collected objective and subjective data from medical students participating in the program. The data demonstrated successful outcomes, including overwhelming medical student satisfaction with the elements of the program, the mentorship and teaching by the Master Clinicians, and improvement in medical students' confidence in their clinical skills. Qualitative and subjective data also showed positive self-reported student outcomes from the program, including acquisition of both traditional clinical skills and skills relating to the "art of medicine". Please refer to the appendix for MCP pilot program data. While many of the principles the medical students learned through the MCP program were generalizable, numerous medical students commented that establishing a MCP program in the other core third year clerkships would be of great added value and have a positive impact on their future career.

Objectives:

- Optimize the piloted MCP with respect to mentorship in the areas of empathy and compassion
 - To date, mentorship in the areas of compassion and empathy has relied on translating the strengths of the individual Master Clinician, rather than a formulaic approach. Specifically, in the pilot MCP program, the Master Clinicians were selected based on a track record of excellence in clinical medicine/teaching/mentorship and demonstrating great empathy and compassion with patients and their families. While the Master Clinicians have been successful in mentoring and teaching these skills to medical students, they have no formal training in the areas of empathy and compassion, nor in how to teach these principles to medical students. By obtaining additional training, Master Clinicians will expand these skillsets and acquire the tools necessary to formalize mentorship in these areas.
- Establish and customize the MCP program in all core medical student third-year clerkships
 - The pilot MCP program was launched in the Department of Pediatrics in the 2016-17 academic year. As previously mentioned, many of the principles the medical students learn through the Pediatric MCP program are generalizable, numerous medical students commented that establishing a MCP program in the other core third year clerkships would be of great added value. To that end, the MCP program will be expanded to include all six core clerkships. A needs assessment will inform the exact format of the MCP in each department and the program will be customized to optimize the mentorship experience in these diverse areas of medicine.
- Devise novel methods for evaluating the impact of the MCP on clinical training publication
 - As the MCP is established in each core clerkship, data will be collected examining the impact of the program on medical student clinical training. In addition to the standard programmatic evaluations utilized during the MCP pilot program, we will employ novel research methods to examine objective and subjective measures gauging the extent to which medical students and their patients have benefited from the program. The use of advanced evaluation tools (e.g. neurophysiological measurements) will allow us to quantify the full impact of training in empathy and compassion as compared to traditional training methods.
- Analyze and prepare MCP data for publication
 - The pilot MCP program has generated data demonstrating successful outcomes. To disseminate this information, the data will be analyzed and submitted for publication. Further, as the MCP is rolled out in other clerkships, pre- and post-intervention data will result in additional publications.

In this manner, we use academically sound methods to demonstrate the success of the MCP as a model for teaching/mentoring future physicians and speak to its limitations and desired improvements. We will also envision how the program may be replicated at other institutions.

Long-term goals:

- Establish the MCP as the “gold standard” for clinical training in medical school
 - The MCP has the potential to change the way we train future physicians. By optimizing the program and generating data proving its efficacy, the MCP may become the gold standard for training during the clinical years in medical school.
- Disseminate MCP to other medical schools and establish sustainability
 - While establishing the MCP at the UCSD School of Medicine serves as a proof of concept and will greatly benefit UCSD medical students who participate in the program, the ultimate goal is to establish sustainability and disseminate this model to other medical schools. In this manner, future generations of physicians, patients and society as a whole will reap the benefits.
- Translate lessons/benefits from MCP to other levels of training/disciplines
 - Mentorship in the areas of empathy and compassion is a critical component of teaching the practice of these skills to future physicians. Moving forward, the lessons learned and benefits of the MCP may be translated to those at other levels of their career (e.g. residents, fellows and practicing physicians). Further, these principles may be used in other keystone professions outside the medical field.
- Leverage the MCP to further understand the biology of empathy and compassion
 - By partnering with researchers at the T. Denny Sanford Institute for Empathy and Compassion, the MCP may be used to further understand the biology of empathy and compassion. In this manner, the MCP may serve as a real-life laboratory to decipher the neurobiological bases of empathy and compassion and to apply new insights to human wellbeing.

Milestones:

Year 1

- Complete Pilot MCP in Pediatrics
- Offer compassion training to Pediatric Master Clinicians
- Define best practices
- Compile/analyze project data from Pediatric MCP
- Identify MCP Oversight Committee and MCP leadership in all departments
- Build MCP administrative and research infrastructure
- Design data collection forms/endpoints
- Establish focus group of fourth-year medical students
- Needs assessment for each clerkship’s MCP

Year 2

- Publish pilot data from Pediatric MCP
- Offer compassion training Master Clinicians in additional departments
- Collect baseline data for all clerkships
- Establish MCP in second clerkship

Year 3

- Establish MCP in third/fourth clerkships
- Compile/analyze data from second clerkship MCP
- Develop MCP Projects in each Department

Year 4

- Establish MCP in fifth/sixth clerkships
- Publish data from additional clerkship MCP
- Expand MCP to include core fourth-year clinical rotations

Year 5

- Write up data on overarching MCP in all Departments
- Host Sanford Institute Symposium to disseminate MCP vision and data
- Replicate program at sister school (i.e. Sanford School of Medicine)
- Analyze data/Optimize MCP across all clerkships (process improvement)

Center Management and Operations:

Operation of the MCP will be overseen by the Master Clinician Program Director who will report to the Institute Director, Executive Council and Scientific Review Board. The MCP Director and MCP Program Coordinator will be responsible for the day-to-day management of resources and for the supervision of the MCP programs. The MCP Associate Director of Evaluation and Research will assist each department with individualized needs assessments, programmatic evaluation, data management and academic productivity. Each of the six core third year clerkships will have a MCP Associate Director who, in conjunction with the MCP Director, will oversee the Master Clinicians and Coordinators within their Department. Please refer to the MCP Organizational Chart below.

MCP Organizational Chart:

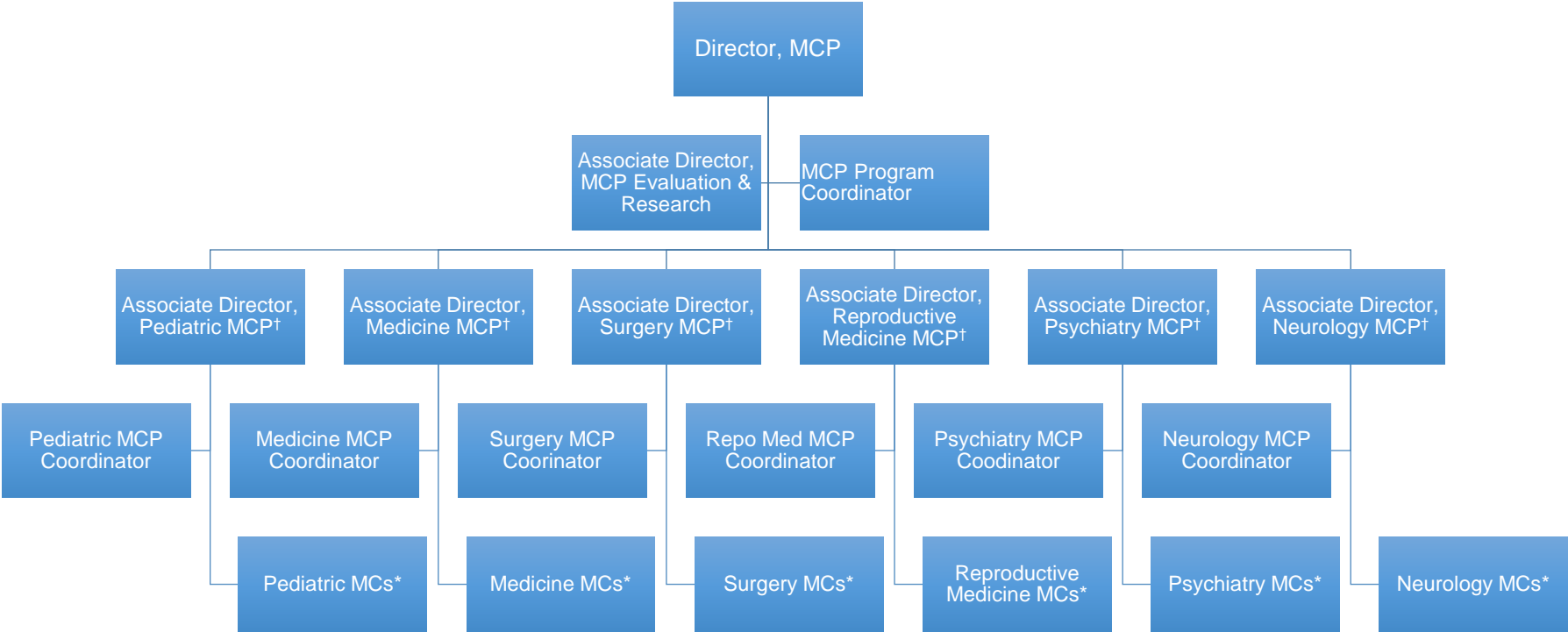


Figure 1. MCP Data (Word) Cloud: The visual representation of free form text data from medical students; the importance of each tag is shown with font size to highlight the most prominent terms.



Figure 2. MCP Overall Program Evaluation: Medical students were asked to rate their satisfaction with the MCP program elements on a 5-point Likert scale.

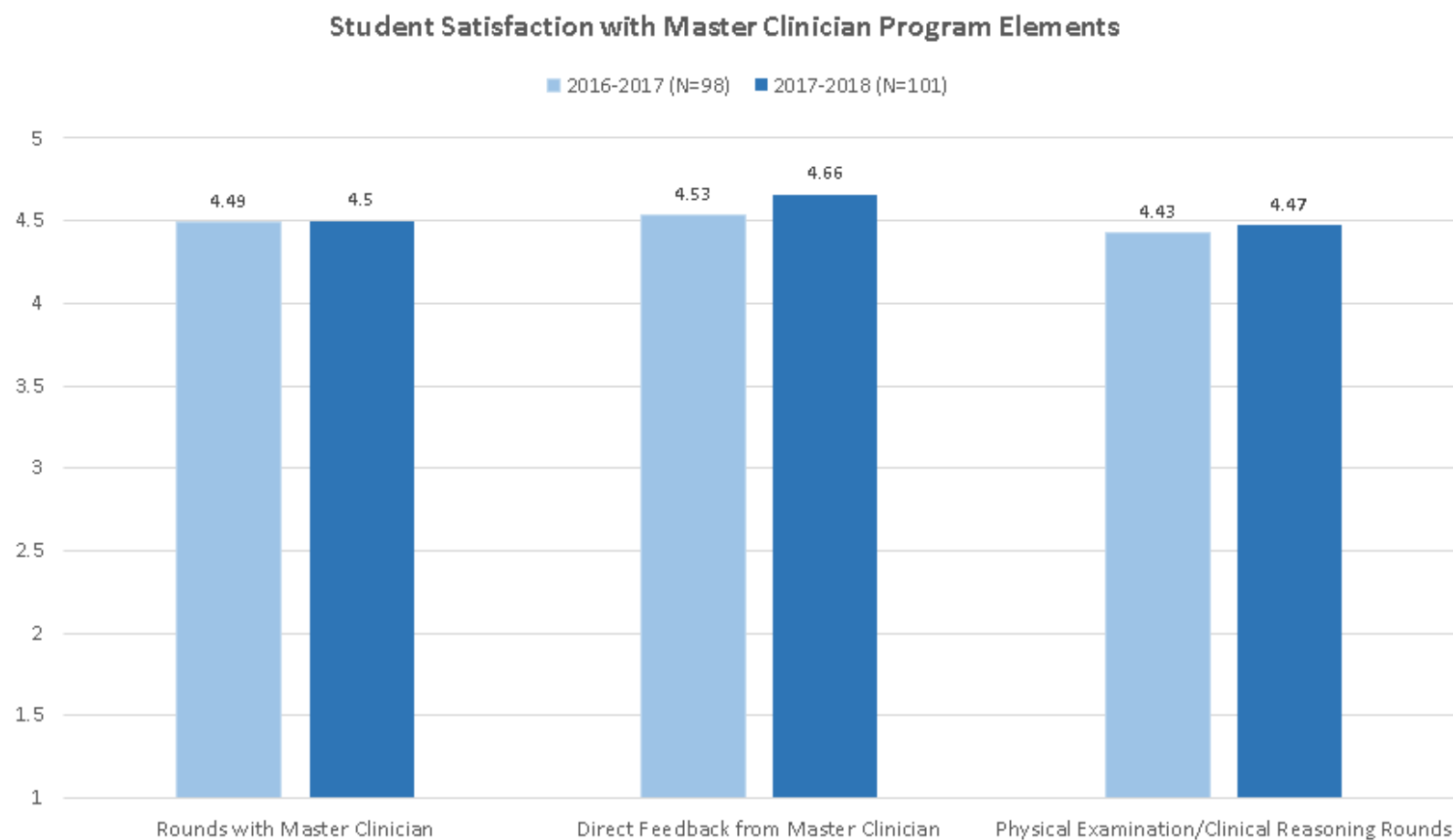


Figure 3. MCP Teaching/Mentorship Evaluation: Medical students were asked to evaluate the following 13 domains on a 5-point Likert scale.

- 1. Provided me with constructive feedback
- 2. Helped me improve my presentation skills
- 3. Helped me improve my clinical reasoning skills
- 4. Helped me improve my physical examination skills
- 5. Helped me increase my Pediatric-specific fund of knowledge
- 6. Provided me with a worthwhile learning experience overall
- 7. Established a good learning environment
- 8. Devoted time to observing or demonstrating clinical skills
- 9. Offered regular, constructive feedback that was helpful in furthering my learning goals
- 10. Effectively coached me on my clinical skills by reinforcing positive aspects, correcting mistakes and offering suggestions for improvement
- 11. Helped me improve my clinical reasoning skills and fund of knowledge by explaining concepts clearly and by asking questions that promote learning
- 12. Modeled respectful and appropriate communication skills in professional interactions with others
- 13. Overall, effective clinical teacher and mentor

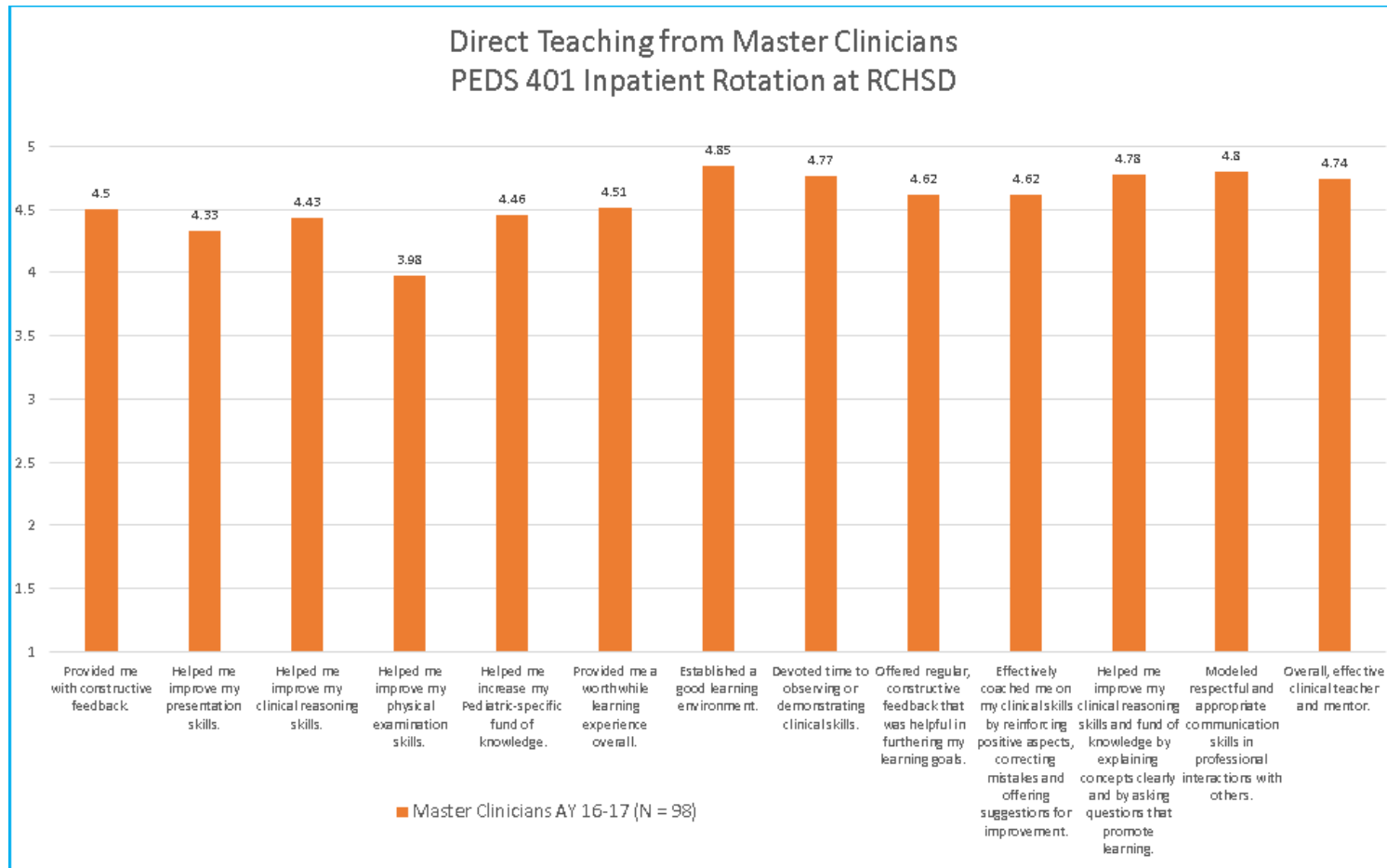


Figure 4. MCP Improvement in Student Confidence in Clinical Skills: Medical students were asked to rate their confidence at the beginning and end of the rotation on a 5-point Likert scale.

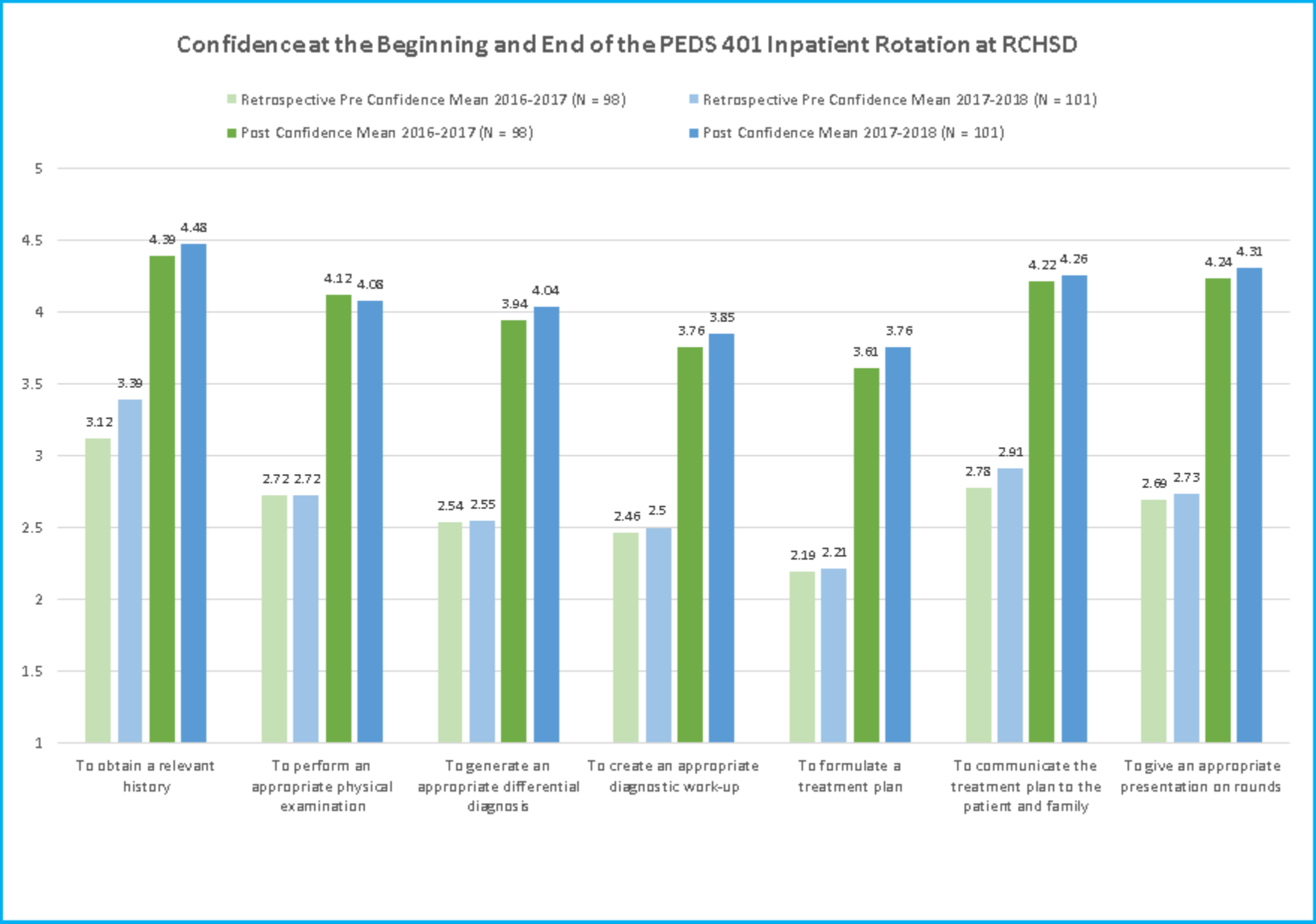


Table 1. MCP Qualitative Data: Medical student comments were coded into categories by two blinded evaluators. The most common categories are listed below, along with their frequency and representative quotes from the narrative comments.

Categories	Total Number of Comments N = 228	Quotes
Worthwhile Experience/ Continue	83	<ul style="list-style-type: none"> By far the most beneficial part of my 3rd year clinical experience at UCSD Valuable experience during my inpatient pediatrics rotation Wish that it was made available for every rotation Highly recommend for other clerkships I feel like it helped me end my 3rd year on a stronger note than I would have otherwise
Presentation Skills	74	<ul style="list-style-type: none"> How to present on rounds Helped to improve my abilities in presenting/polish my presentations Feedback about my presenting style How to better organize my presentations for rounds Learning to focus on pertinent information to present on round
Feedback/ Individualized Learning	64	<ul style="list-style-type: none"> Direct, detailed & thoughtful feedback Constructive feedback 1-on-1 /individualized feedback Allowed me to adapt and respond to feedback immediately
Patient care/ Clinical skills/ Clinical Reasoning	46	<ul style="list-style-type: none"> Taught us more nuanced aspects of patient care Made me a better clinician Helped me to greatly improve my abilities in seeing patients Feedback helped me improve in my clinical reasoning
MCP Attending Exposure (Time with MC, Longitudinal, Work closely with attending, Safe learning environment, Mentorship with attending)	44	<ul style="list-style-type: none"> Attending level clinician dedicate time to critiquing our performance Continuity throughout the rotation Not have to worry about being graded/safe environment Unbiased teacher strictly to teach me how to improve Offers a unique mentoring relationship
Clinical Pearls	28	<ul style="list-style-type: none"> Taught a lot of the "intangibles" that were outside of direct medical care Great real world experience and clinical pearls Big picture advice on how to approach and learn best during 3rd year How to take the time to enjoy the work in an otherwise strenuous and fast-paced environment How to navigate EPIC better during pre-rounding
Note Writing	28	<ul style="list-style-type: none"> Note writing skills were greatly improved How to improve H&P readability Efficient note writing Organization of notes Important aspects to include in notes Knowing what things can be excluded from notes
Physical Examination	24	<ul style="list-style-type: none"> Improving my PEX skills Importance of physical exam versus just relying on labs and imaging Important physical exam skills and findings Specific instructions for how to perform focused PEX by specialist Really loved the physical exam round sessions
Communication skills	21	<ul style="list-style-type: none"> Improving my skills as not only a physician but communicator Importance of clear communication Eye contact Benefits of talking directly to families during FCR Approach to communicating simultaneously with attending/team and the patients What things are appropriate to say in front of the family vs not How to communicate both medical non-medical topics to families

Table 2. MCP Subjective Comments from Medical Students:

<p style="text-align: center;"><u>1. Comments re: MCP Program</u></p> <ul style="list-style-type: none"> • “The feedback provided during our teaching sessions was a pivotal experience in my 3rd year. I feel significantly stronger in my approach to clinical thinking as well as communication style. I appreciated the scheduled, regular sessions to meet with us starting early in the rotation, so that we could start to improve early on and get new and different feedback as we progressed with our skills. This is an incredible program that I really benefitted from!” • “Amazing supplementation to my learning during the Pediatrics rotation. The feedback I received was incredibly valuable to improving my skills as not only a physician but as a communicator. The feedback sessions were the most helpful and individualized lessons I have gotten thus far in medical school, and it was much more useful than general tips and suggestions I have gotten in the past.” • “I could not have asked for a more exemplary medical education program. The Master Clinician went to great lengths to ensure I was constantly reflecting on my skills as a medical student and working to improve them, adapted to whatever teaching I required, and offered pertinent, detailed feedback that allowed me to grow and improve. Also, the Master Clinician had great ideas for improving my efficiency- wasn't just satisfied with telling me what I was doing wrong and leaving me to fix it. Very, very, very approachable, I felt like I could bring up any concerns I might have and they would be taken seriously.” • “The feedback and instruction from the Master Clinician has been some of the most useful and helpful lessons I have received since starting medical school. It was personalized to my strengths and weaknesses with detailed instruction on how to improve my skills. It was very apparent to me that this instructor truly fits the description of Master Clinician given the detailed knowledge and understanding of crafting ideal H&Ps, presentations, and conducting a comprehensive physical examination.” • “I thought that the Master Clinician Program was a valuable experience during my inpatient pediatrics rotation. I really appreciated the significant amount of feedback I received from my Master Clinician, and I liked that I could give my best effort and not have to worry about being graded. I also learned a lot from my Master Clinician, from tips on presenting to more general advice related to hospital medicine in pediatrics. I feel like I improved a great deal from my first week to my last week on inpatient, and I truly believe that getting one-on-one advice from my Master Clinician throughout the process helped significantly.” • “This was by far the most beneficial part of my 3rd year clinical experience at UCSF. This was the first time I had an unbiased teacher there strictly to teach me how to improve. I made the most improvements I have as a student in a single month than I have in three years. Having highly individualized feedback about my presentations and presenting style really gave me an inside look into how to move forward. I feel so much more prepared for 4th year and any future inpatient rotation because of this.”
<p style="text-align: center;"><u>2. Comments re: Master Clinician</u></p> <ul style="list-style-type: none"> • “Dr. X as my master clinician literally provided me with the best medical education experience I've had at UCSF. I am so appreciative of how attentive he was during my presentations and when reading my H&P. I felt he was completely non-judgmental and gave extremely useful and specific suggestions on how to improve. I feel I improved so much in such a short span of time because of the attention to detail he had for me as an individual and not just an MS3 monolith. I am so grateful to have had the opportunity to work with him and I am saddened that not all students get to have that same opportunity.” • “I loved the MC program, it was incredibly helpful and a great system that the clerkship has established. I truly felt like this was the one time this year I got the chance to be coached on how to be a better team member & medical student. It was so important for me to hear the feedback I got. I think the number of times we met was just right, and there was a nice balance of feedback on H&Ps and daily presentations. I really liked and appreciated how detail oriented Dr. X was during my presentations, he really paid attention to everything I said and I had the chance to get feedback on all parts of my work. Overall, this program and Dr. X made me more confident as he reassured me in what I was already doing well, and he told me where I could use more practice and I felt like I had plenty of practice this rotation to do so. My favorite part of all this is I felt very supported and clearly a lot of attention and hard work has been dedicated towards us improving by the faculty which is a really nice feeling to have. Thank you so much!” • “Dr. X was a wonderful Master Clinician. She observed multiple presentations and was able to give personalized feedback in the moment, which was very helpful. I liked how she quietly observed how I interacted with the team and families before and during the presentation so that the environment mimicked how a normal day of rounding would proceed. Dr. X gave useful pointers on how to come up with a differential and how to present the differential and pertinent negatives/positives effectively during presentations. Most importantly, I could tell that Dr. X was invested in my learning and she always contributed to my progress as a student.” • “Dr. X was the best teacher I had the pleasure of learning from over the course of inpatient pediatrics. He provided fantastic feedback on writing H&Ps and explained complex medical concepts in simple language. The depth of his knowledge is truly remarkable. Master clinician is an understatement.” • “Dr. X was an excellent Master Clinician. He paid very close attention to me and offered very regular feedback. I really appreciated his teaching directed towards me during family centered rounds. It's rare that a medical student gets such intensive feedback and I benefitted tremendously from working with Dr. X. Thank you.” • “Dr. X was approachable, accessible, and effective in refining my clinical performance. I sincerely appreciate her investment in advancing my learning and development. She was the most effective.” • “Could not have asked for a more exemplary Master Clinician. Went to great lengths to ensure I was constantly reflecting on my skills as a medical student and working to improve them. Adapted to whatever teaching I required, and offered pertinent, detailed feedback that allowed me to grow and improve. Also had great ideas for improving my efficiency, wasn't just satisfied with telling me what I was doing wrong and leaving me to fix it. Very, very, very approachable, I felt like I could bring up any concerns I might have and they would be taken seriously.”
<p style="text-align: center;"><u>3. Comments re: Art of Medicine</u></p> <ul style="list-style-type: none"> • “I really appreciated how our Master Clinician emphasized the humanistic side of rounding, as well as medicine. He pulled us back from only seeing illness, and focused on the patients as well as the family.” • “I thought the Master Clinician did a great job in giving feedback both positive and constructive in a way that was non-intimidating. I especially appreciated her perspective when she highlighted some ways we can better interact with our patients. Although seldom done, it's wonderful that she was able to give us some pointers on the 'art of medicine'.” • “Our Master Clinician provided in depth analysis of patient's and social situations that I think greatly strengthened my understanding of biopsychosocial aspects of patient care.”

- “The Master Clinician was extremely helpful in giving me insight on how to be a better clinician. Furthermore, she emphasized patient-centered care in teaching me how to effectively conduct FCR (family centered rounding) **in a way that engages families and helps them participate in medical decision making.**”
- “**Awesome program. AS much an emotional support as a clinical one.**”
- “Our Master Clinician was wonderful to learn from and **shared many keen insights on the doctor-patient relationship** and physical exams during rounds.”

Center for Interpersonal Communication

Background:

Interpersonal communication between physicians and patients is the centerpiece of effective and compassionate healthcare. Robust evidence suggests that effective communication enhances patient experience and physician engagement. High-quality communication is also associated with better care coordination, quality, improved compliance with health recommendations and improved health outcomes. These critical interpersonal communication skills can be readily taught, learned, practiced and improved however training opportunities are needed to improve upon existing skills.

Patient Experience and Value-Based Care

While patient experience has long been a focus of health systems and hospitals, the shift by Centers for Medicare and Medicaid Services (CMS) to a Value-Based Purchasing program establishes accountability in hospital performance and rewards quality of care, which includes scores in a Person and Community Engagement domain (formerly Patient and Caregiver-Centered Experience of Care). Of the eight measures in this domain, three directly relate to communication and the others may be influenced through positive or negative communications. Institutions like the Cleveland Clinic that have focused on enhancing physician and other clinical provider's interpersonal skills have seen improved scores across patient experience surveys HCAHPS and CGCAHPS. Investment in time and resources to physician communication skills is essential as the U.S. healthcare system continues its shift to a Value-Based Purchasing program.

Physician Burnout

Physician burnout is a serious national problem, affecting more than 50% of U.S. physicians, leading to increased physician suicide rates, poor health outcomes, and a decreasing physician workforce (Thiriaux et al., 2016; West et al., 2016). While rates of burnout vary depending on specialty, gender and age group, it is critical to address given its bearing on patient outcomes, patient-physician relationships, physician retention and relationships with leaders, colleagues and other team members. Improved patient interpersonal communication skills has been shown as an intervention that successfully addresses burnout and improves physician efficacy and engagement, better connecting physicians to the meaning of medicine.

The effectiveness of a physician's direct leader also correlates with prevention of burnout. Many physicians take on leadership responsibilities at one time or another during their careers and need to learn and acquire management and leadership skills to coach, develop others and effectively lead. A skilled physician leader trained in the aforementioned skills will more effectively lead and support their departments, physicians and care teams.

Vision:

Physician interpersonal communication is a strategic priority requiring an institutional focus given the impact to UC San Diego Health's patients and physicians. A dedicated *Center of Interpersonal Communication* that leverages UC San Diego faculty already recognized as leaders in the physician communication field will enhance patient experience, improve organizational reputation and decrease our physician's burnout rates and turnover. We will emphasize trainings to enhance physician empathy and compassion and train leaders to more effectively communicate and coach. We will monitor the effects of our training programs by employing subjective, physician-based measures and through patient-based subjective measures of physician empathy and compassion, including the Jefferson Scale of Empathy (JSE) and the Jefferson Patient Perception of Physician Empathy (JSPPPE). In addition, we intend to incorporate measures of Physician burnout, using the Maslach Burnout Inventory (MBI) scales of overall burnout, emotional exhaustion and depersonalization as these measures have been demonstrated to benefit by a number of training modalities administered to physicians (West et al., 2016).

Initially focusing on new clinical faculty, training will include didactic and experiential teaching methodologies and establish a baseline expectation for physician communications with patients, colleagues and peers. Trainings will then expand to include all UC San Diego Health physicians enhancing their ability to practice empathy and compassion in our hospitals and ambulatory clinics. The course structure allows for a cohesive group of participants creating an added benefit to physicians – peer connection and support. These physicians will also be equipped to better teach and model affective empathy in settings with their medical students and residents thus allowing the Center to impact future generations of practicing physicians. By developing and deploying leadership communication training, UC San Diego Health leaders will be more effective in their communications with physicians further improving physician satisfaction and engagement.

The functions of this Center include: 1) assembling current UC San Diego faculty experts in Physician Communication to develop and deploy interpersonal skills trainings across internal and external physician populations; 2) establishing baseline UC San Diego Health physician communication standards; 3) defining metrics to evaluate outcomes of interpersonal skills training; 4) improving patient satisfaction and physician engagement scores and 5) facilitating research into interpersonal communication skills training and its methods, effectiveness and outcomes.

The Center's trainings will create value for the institution by enhancing physician's communication skills, improving physician engagement with the caring and empathetic domains of care and improving their practice and professional satisfaction. Faculty lead teams of caregivers, learners and researchers and improving their leadership communication skills will also enhance their organizational effectiveness. Finally, UC San Diego Health will establish itself as a leader of compassionate healthcare in the greater San Diego region and nationally as research in compassionate, empathetic communication is published and trainings are expanded to external physicians and health systems.

Objectives:

- Improve physician interpersonal communication skills at UC San Diego Health.
- Improve patient satisfaction and physician engagement at UC San Diego Health through enhanced physician communication training.
- Improve leadership communication at UC San Diego Health to better support physicians, clinicians, learners and staff and the effectiveness of clinical teams.

Long-term Goals:

- Distinguish UC San Diego Health as leaders in the field of effective physician communication and compassionate medical care.
- Distinguish UC San Diego Health internationally as leaders in effective and empathic communication training.
- Establish UC San Diego Health as a center of research into effective interpersonal communication in the modern era.

Milestones:

Year 1

- Establish an Executive Steering Committee for the Center for Interpersonal Communication.
- Establish an Advisory Board consisting of a broad range of faculty communication leaders and patient advocates.
- Plan the space for the staff and educational courses of the Center.
- Recruit expert in Physician Communications to serve as Center Program Director.

- Assemble current UC San Diego Health experts in Physician Communication to identify and cultivate faculty educators and champions across service lines, departments and divisions.
- Establish baseline standards for physician communication at UC San Diego Health.
- Develop curricula for Interpersonal Communication skills training for new UC San Diego Health clinic faculty.
- Launch Interpersonal Communication skills training and establish as a requirement for all new clinical faculty onboarding – 12 sessions per year.
- Initiate the use of subjective measures of self and patient perceived empathy and compassion using the JSE and JSPPPE.
- Hold first two-day Training Retreat to explore content and trends in patient-physician interpersonal communication.

Year 2

- Begin Interpersonal Communication refresher courses for existing UC San Diego Health physicians – 60 sessions
- Develop content and training on Advanced Topics – Difficult Conversations, Breaking Bad News with Compassion, etc.
- Initiate the Leadership communication training curriculum.
- Continue to collect subjective measures of self and patient perceived empathy and compassion using the JSE and JSPPPE and begin to measure the impact of training on the MBI.

Year 3

- Establish criteria for evaluation of training outcomes (improvement of baseline patient satisfaction and physician engagement scores)
- Assess improvement of communication through data collection
- Develop content on management of patient communication in the electronic era (incorporating online training, teaching MyChart communication and email communication standards)

Year 4

- Establish a funded research effort in interpersonal communication skills and training
- Offer courses to external physicians
- Evaluate data on effectiveness of curriculum
- While continuing to use the JSE, JSPPPE and MBI with the Center for Research innovate new measures that speak to physician empathy and compassion.

Year 5

- Publish results of interpersonal communication skills trainings and impact on patient satisfaction and physician engagement.
- Implement new and/or updated programs to optimize effectiveness based on research.
- Expand training opportunities to other clinical professionals and team members.

Center Management and Operations:

This Center will be managed by a Center Director, supported by a Program Administrator. The Center Director will be a faculty member and may be currently a part of the UC San Diego faculty body or recruited to UC San Diego. The Center Director will report to the Dean of Clinical Affairs and have a coordinating Executive Steering Committee. Under direction of the Center Director, the Program Administrator will be responsible for the day-to-day management of Center resources and finances.

Initial center development will be directed by an Executive Steering Committee consisting of executive and faculty leaders with a passion for enhancing physician interpersonal communication skills and patient-provider relationships. To ensure alignment among current UC San Diego Health physicians, an Advisory Board of 15 to 20 physicians and patient advocates will be established, initially participate in a visioning session and then meeting quarterly as advisors to the Center Director. The future state of the Center may also include a small group of current and former patients and caregivers to participate in retreats and provide feedback on relevant topics.

Trainings will be conducted by Faculty Educators, across all specialties, who may be existing UC San Diego faculty. These Educators will be trained to facilitate effective trainings and serve as resources for physicians.

The Center for Research on Empathy and Compassion

Executive Summary:

Advances in neuroscience have enabled research into the fundamental neurobiology of empathy and compassion. This young field of study promises exciting new insights into the neural mechanisms that underlie empathy and compassion. Importantly, they predict that exploring this domain of neuroscience can be used not only to understand the brain basis of empathy and compassion but also to design training programs that enhance these elements of brain function. This Center will inform and advancing the research mission through recruiting and supporting a research faculty, seed funding of research projects, selecting and supporting the Sanford Research Fellows, and creating and sustaining a symposium series and yearly international conference at which investigators detail the state-of-the-art in research and practice of empathy and compassion. In serving as the research home of the Center it is poised to contribute significantly to its success.

Background:

It is difficult to conceive of a topic more important than understanding human caring for those who are suffering from disease, neglect, or injustice. Empathy and compassion are vital for addressing these concerns. Long considered the province of religion and philosophy, through much of the 20th century empathy and compassion were addressed largely through neuropsychology and the social sciences. However, with advances in neurotechnology, and their extension to human cognition and emotion, the last 25 years have seen a burgeoning of interest in the neuroscience research community and through integration across neuroscience disciplines the emergence of significant advances in understanding the neurobiological bases for these key elements of human mind. Indeed, modern neurobiologically-based studies of empathy and compassion have provided unprecedented insights into the brain regions and neural circuits that participate in the emotional and cognitive underpinnings of empathy and the neural functions underlying compassion. With these advances, and with increased availability of new tools for neurobiology, the future is bright for building a powerful body of knowledge that supports both understanding empathy and compassion and its application in real-world settings. Recent advances support the view that not only will neuroscientists decipher the critical neural pathways engaged in empathy and compassion but will also gain the ability to employ the signals arising from participating circuits to strengthen their operations thus increasing their valence.

Vision:

The Institute intends to serve as a preeminent source for the science of empathy and compassion. Under this Center it will bring together a transdisciplinary research faculty to engage in the rigorous pursuit of new knowledge and the translation of insights into training programs that enhance empathy and compassion. Building on current knowledge it aims to greatly expanding understanding of the neurobiological basis of empathy and compassion (see discussion of the Neurobiological Bases of Empathy and Compassion, above). The Institute's robust research agenda will be carried out at both the basic and applied levels. The basic science agenda will focus on the fundamental features of neural function in the context of paradigms that engage empathy and compassion. Important questions concern the means by which participating circuits are activated, the temporal facets and dynamics of their engagement and, importantly, the extent to which they demonstrate plastic responses in the context of interventions that engage them. In so doing the Institute intends to reach out to colleagues across the spectrum of faculty engaged in the neurobiological, behavioral, and social sciences and engineering. Because new tools are needed the Institute will engage colleagues whose expertise ranges from neurophysiology and behavior to those who create virtual reality environments and collect and analyze complex datasets. A rich harvest of new concepts is predicted. At the applied level Institute faculty will document the changes in brain that result from training in empathy and compassion and, in turn, to use basic science insights to enhance such programs. Finally, we will build bridges that link basic to applied, and back again, to define not only which training programs enhance empathy and compassion but also how

they do so. Through its focus on both basic and applied research the Institute will serve as a singular source of leadership nationally and internationally in empathy and compassion science.

The work of this Center will be enhanced by the institution of the **Sanford Fellows** program under which young investigators, graduate students and postdoctoral fellows, pursue research under the supervision of a faculty mentor. The Sanford Fellows will be chosen through a process that encourages campus-wide participation and that awards funding to the most meritorious proposals, as drafted by potential fellows and their mentors. Successful candidates will represent the vanguard of the next generation of investigators whose career is devoted to the science of empathy and compassion and, as such, will propagate the Institute's message and agenda well beyond UC San Diego.

Objectives:

- Materially advance progress in defining the neurobiological bases for empathy and compassion.
- In so doing create an exciting, rigorous research environment for basic discovery.
- Create methods by which to increase plasticity of empathy and compassion circuits, demonstrably linking increased such activity to subjective and rigorous objective measures of these mental states.
- Translate insights derived from initial basic research efforts into novel, next generation training programs for medical students and faculty.
- Demonstrably enhance the ability of UC San Diego medical students and faculty to function as empathic and compassionate physicians.
- Establish UC San Diego as the internationally recognized center of excellence for basic and applied research in empathy and compassion.
- Define the infrastructure needed to sustain both the basic neurobiological research efforts and their translation to the medical community and beyond.

Long-term Goals:

- Develop measures to assess empathic and compassionate behavior for physicians and other health professionals, as measured both objectively and experientially, in the context of patient encounters and in real-world settings.
- Export and test the efficacy of methods developed at UC San Diego in other medical schools, both in the United States and elsewhere.
- Extend initial observations in student-physicians and physicians to students and faculty of the campus at-large.

Milestones:

Year 1

- Initiate academic process to establish professorships.
- Establish internal advisory group to inform research efforts and strategy.
- Announce and publicize seed funding for projects aligned with research strategy; accept applications.
- Advertise first round of Sanford Research Fellowships and attract candidates.

Year 2

- Announce funding for first round of research projects.
- Sanford Research Fellows selected and projects/principal investigators matched.
- Create international scientific review board to inform research strategy.

- Identify key research domains for faculty recruitments.
- Announce search for new faculty.
- Establish methods for evaluating research initiatives under each program element
- Announce seed funding for collaborations, particularly for the Sanford Network, and seek proposals.
- Hold first international annual conference to review the state-of-the-art research in empathy and compassion

Year 3

- Publicize second round of seed funding application requirements, accept and review applications.
- Enhance the neuroimaging infrastructure to support research studies.
- Review proposals for collaboration within the Sanford Network and announce recipients.

Year 4

- Announce second round of Sanford Research Fellowships, accept applications and choose new Fellows.
- Fund second round of seed proposals and initiate studies.
- Announce second round of inter-institutional collaborations within and beyond the Sanford Network and seek proposals.
- Publicize third round of seed funding application requirements, accept and review applications.

Year 5

- Award funding for third round of seed grants and initiate this research.
- Select and fund second round of collaborative inter-institutional research proposals.
- Publish a five-year progress report that reviews: a) research strategies, b) initiatives undertaken, c) basic science findings, d) analysis of preexisting training programs, e) how basic science insights were used to inform second generation training programs, f) measured impact of these programs on empathy and compassion for medical students and faculty, and g) initial results from distributing training programs to institutions beyond UC San Diego.
- Engage internal and international external advisors to define a plan for the next 5 years of research operations.

Center Management and Operations:

The chief functions of this Center include: 1) attracting, recruiting and supporting a research faculty, some of whom may be current UC San Diego faculty but many recruited to the campus; 2) announcing opportunities for seed funding of research projects of interest to the Institute; 3) attracting, interviewing and supporting Sanford Research Fellows; 4) though seed funding, supporting institutional collaborations beyond UC San Diego, especially within the Sanford Network; and 5) creating a regular symposium series focused on Institute priorities together with a yearly international conference at which distinguished investigators will joint with UC San Diego researchers to detail the state-of-the-art in research on empathy, compassion and related topics. The operation of this Center will be overseen by the Institute Director, as supported by a Co-Director for the Research Center and by the Institute Administrator. The Co-Director and Administrator will be responsible for the day-to-day management of Center resources and finances and for the supervision of Research Staff, including those hired to support the Research Core. The latter will provide statistical and other core support services to research programs, as requested and as effort permits.

The recruitment of existing faculty will follow a process agreed upon by the Oversight Committee (EVC) and the office of the VC for Health Sciences. In general, current faculty will have demonstrated interest in Institute research

themes and activities and will be nominated for 'Institute Affiliate Faculty' status by the Chair(s) of their home department(s) and Dean(s). Faculty appointments will be reviewed by the internal advisory committee, a committee of UC San Diego faculty with appropriate disciplinary expertise and academic accomplishments. The final decision regarding appointment will follow a process under which the Director works with the Chair(s) and Dean(s) of chosen faculty to arrive at a mutually acceptable plan. Newly appointed current faculty may request support for research activities; requests for support will be reviewed by the internal advisory committee.

Recruitment of new – i.e. non-current - UC San Diego faculty will be through an open, nationwide search employing search committees that represent each of the departments and schools interested in a candidate matching the description of research interest. The search committee will nominate candidates for 'Institute Affiliate' status and the Director will work with Departments and Schools to secure the best fit. It is anticipated that the Institute will play an important role in providing the financial resources for such recruits, with the details regarding finances, space and level and series of appointment to be decided in collaboration with the accepting department(s) and school(s).

For seed funding research initiatives, both internal to UC San Diego and through collaborations with other institutions, the Co-Director and Administrator will work closely with the internal advisory group to announce the initiatives and review proposals. In general, the availability of seed funding for UC San Diego will be announced and campus-wide participation sought. Announcement of collaborations between UC San Diego and other institutions will follow a similar process but will be tailored to include institutions best suited for submitting successful applications for specific research themes. Successful applicants will be asked to provide regular reports of progress and to present their findings at meetings of Institute faculty and yearly meetings. The internal advisory committee will review applications from potential Sanford Fellows. Successful fellowship applicants will submit regular reviews of progress and be asked to present orally or via poster and yearly meetings of the Institute.

The symposium series and yearly international meetings will be informed by the internal advisory committee, all 'Affiliate Faculty' members, and through discussions with an International Scientific Review Board. Meetings will focus on building awareness of the Institute locally and beyond, bringing latest advances to the notice of faculty and students and providing a forum to discuss research topics, basic and applied, in the field of empathy and compassion science and practice.

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